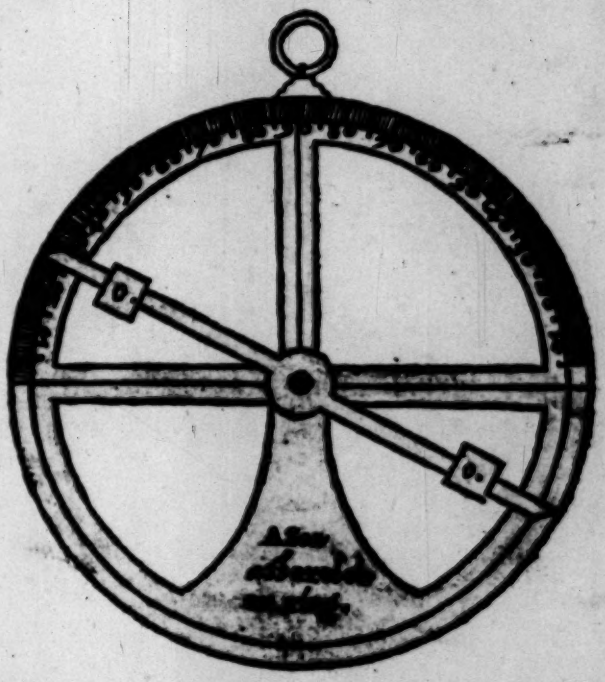
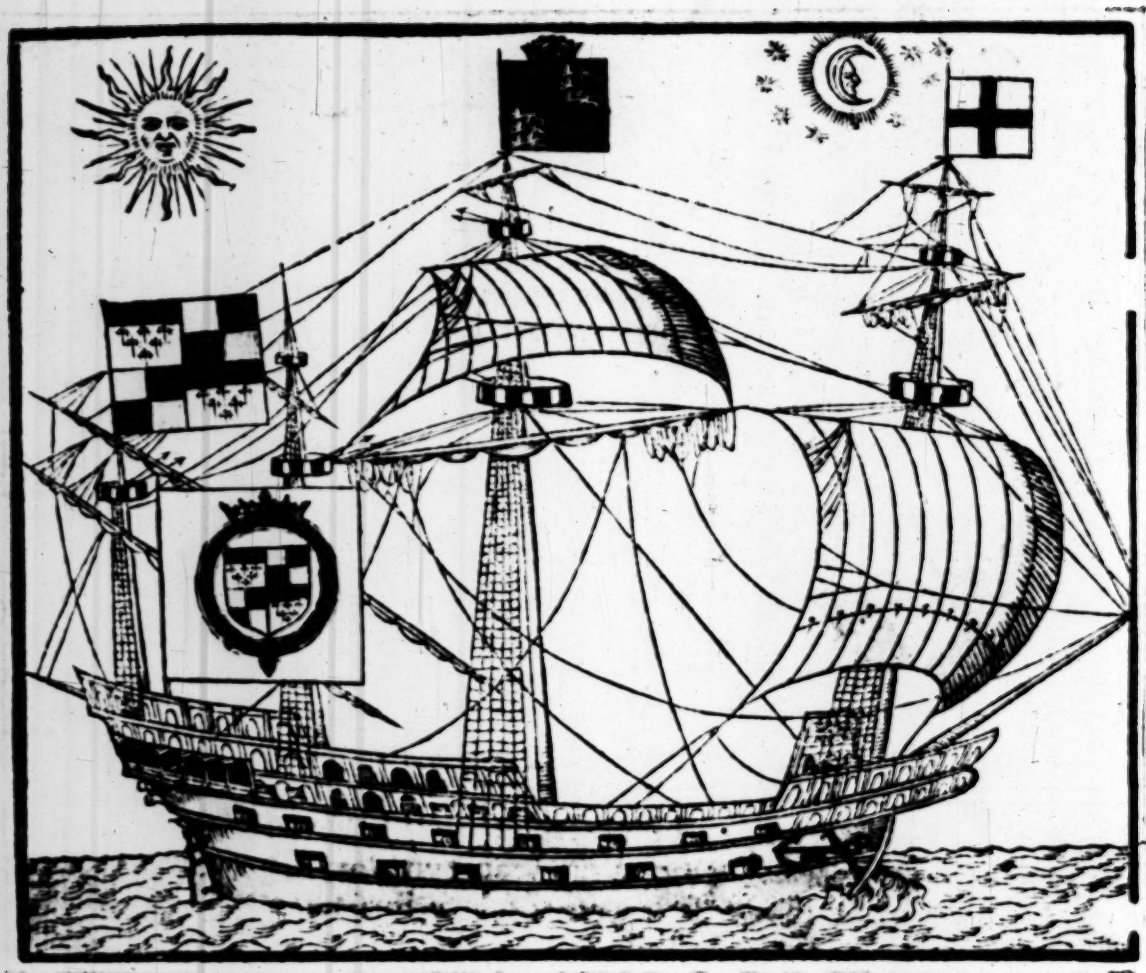
# ¶A REGIMENT for the Sea:

Conteyning moſt profitable Rules, *Mathematical experiences, and perfect* knowvledge of Nauigation, for all Coaſtes and *Countreys: moſt needefull and neceſſarie for all Seafaring* men and Trauellers, as Pilotes, Mariners, Marchants. &c. Exactly deuiſed and made by VVilliam Bourne.



¶ Imprinted at London by Thomas Hacket, and are to be ſolde at his ſhop in the Royall Exchaunge, at the Signe of the Greene Dragon.



# TO THE RIGHT

## Honorable, Edwarde Earle of Lincolne, *Baron of Clinton and Say, Knight* of the Noble order of the Garter, Lorde highe Admirall of Englande, Irelande, and VVales, and of the Dominions and Iles thereof, of the Towne of Calice, and Marches of the ſame, Normandie, Gaſcoygne and Guyone, and Captayne generall of the Queenes Maieſties Seas and Nauy Royall: *William Bourne* wiſheth increaſe of honor in perfect health.

RIghte honorable and my ſingular good Lord and Maſter, vvhen I had often repeated and called to my remembraunce the opinion and ſayings of the ſage and auncient VVriters, that one man ſhould be an inſtructer to an other, by ſeeking and paynes taking to doe them good: ſo at ſundry times haue I ſtudied and deuiſed vvith my ſelfe vvhat thing to take in hande that might moſt profite my friends, and my [illegible]re countrey: and at the length it came vnto my remembrance hovv neceſſarie a thing it vvas for Seafaring men to haue ſome good inſtructions, vvhervpon I haue vvritten this baſe and ſimple Regiment for the Sea, and Rules of Nauigation, for that I knovve it to be ſo needefull and neceſſarie for all ſortes of Sea men. Therfore at ſundrie times as I haue had leaſure, I haue compyled and vvritten this baſe and ſimple vvorke, calling to remembraunce the ſaying of Plinie, vvho

thought all that time loſt vvhich he did not beſtovve at his booke: I beeing of all other moſt ſimple, yet notvvithſtanding this enterpriſe haue I taken in hande, to publiſhe this ſimple booke vnto all men. And for that, all my labours be due vnto your Honorable Lordſhip, according to my bounden dutie I preferre it vnto your Honor, hoping that your Lordſhip vvill voutchſafe to take it in good parte, and to receyue this barbarous vvorke, more to take it as my good vvill (vvhiche is to offer things of much more excellencie) than the fineneſſe of the vvorke, for that it is but ſimple. And ſo ſhall I not onely be ſatisfied, but alſo further encouraged heereafeer to trauell, according to the ſimple gifte and talent that God hath giuen vnto me: for that it is not altogither gathered out of other bokes, but that the greateſt part is deuiſed and practiſed by me. Therefore I truſt my labours (ſuche as they be) ſhall not hynder the cunning and learned ſorte, but further the late beginners that are as yet not vvell inſtructed. And thus I ceaſſe to trouble your honorable Lordeſhip any longer, deſiring you to take this ſimple thing in good part, as a true token and ſigne of my good vvill, beſeeching God of his grace to proſper your Lordſhip in honor and vertue, vvith perfect health. Amen.

By your Honors poore ſeruant *William Bourne*.

# The Preface to the Reader.

IN my opinion (gentle Reader) which also is the saying and writing of all the Philosophers, those thinges are moste principally to be taught and mayntained, whiche in the common wealth are moste profitable and necessarie. Then may I boldely say (without iust cause of reproofe) and affirme, that Nauigation is not the least but one of the principal matters to be knowne, as this time dothe require: Considering the state and situation of our countrie, for that we be inuironed rounde aboute with the Sea, so that we neither can go out of our countrie, neyther they that are of other countries can come at vs, but onely by Sea. These things (I say) considered, what can there be more necessarie to be taught in our common wealth than Nauigation, considering also what Nauigation is: as Nauigation is how to direct ones course vpon or thorow the sea, where he findeth no path to any place assigned, and how to attayne the porte or place appointed in shortest time, how also to preserue the shippe and goodes in al common disturbances, as stormes, daungers by the way, and such other like &c. Moreouer and besides that, it is not vnknowne howe necessarie Nauigation is, both for the transportation of our commodities, to find vent for them in other countries (whereby no small number of people is set a

worke in England) and also t[illegible] or other commodities (that we haue neede of) vnto vs, by which meanes the Queenes Maiestie receyueth no small benefite for hir customes. &c. And furthermore, for that Nauigation is the chiefe force and strength of our countrie, which whether it be true I referre to the iudgement of all men, and although I be but simple (gentle Reader) & a great number of excellent learned men in the Mathematicall Science haue written diuerse bookes of Cosmographie and Nauigation, yet notwithstãding I haue written this Regiment for the Sea with a fewe rules of Nauigation, as it were a nosegay whose floures are of mine owne gathering. And albeit the learned sorte of Seafaring men haue no neede of this booke, yet am I assured that it is a necessarie booke for the simplest sort of Seafaring men: for that they shall finde here the names of the circles in the sphere, with the names of diuerse things meete for Nauigation, togither with their vses, which the most parte of Sea men do mistake or misse call: neyther do they know the vse of them being yet most necessarie for them that vse Nauigation, in whiche also there is a table of declination calculated for .4. yeres, (that is to say, for the yeare of our Lord. 1573. the firste after Bissextilis, the yeare. 1574. beyng the second yeare, & the yeare. 1575. which is the third yeare, with the yeare. 1576. whiche is the yeare of Bissextilis or leape yeare it selfe) whiche the Sea men do call a Regiment, and will serue for .24. yeare without

any

any great errour: and is exactly calculated for the Longitude of London for the instãt time of noone, and will serue all Europe and Affrica, neare vnto the coast of America without much errour, sauing in Februarie, Marche or September, whilest the sunne hath swifte declination. But in June and December it will serue al the world ouer: bycause the sunne hath but slowe declination, &c. And also there be other necessarie rules of Nauigation to know how to handle the Sunnes declination, to knowe the altitude of eyther of the. 2 Poles, (as the contentes of the booke do shewe) with other necessarie things meete to be knowne in Nauigation, and not mentioned in the booke of Martin Curtise called the Arte of Nauigation. Neyther doe I meane to write of any thing mentioned in that booke: for that it is there sufficiently declared already. And thus (gentle Readers) I desire you to beare with my rudenesse, that I shoulde take vpon me to open any science, for that I am vtterly vnlearned, and without helpe of any learned persons, desiring you not to conceyue any euil opinion of me, but to take it as my good will, minding to profite my natiue Countrey as muche as lyeth in me. Notwithstanding it is possible that some people will be offended with me, that I shoulde write this simple Treatise, but then I consider agayne, and knowe, that vertue lacketh no enimies and defacers, and vyce lacketh no friendes and mayntayners, so that knowledge lacketh no contempt, neyther ignorance lacketh furtherance,

and

& especially among all people there is none more ready to contemne, than the ignorãt sort: for ignorance is the father of all errours and the mother of contention. And thus I draw to ende, desiring you to take this simple worke in good part, being willing to pleasure my native countrie according to the simple talent that God hath giuen me And whereas you finde any errour I pray you let me gently vnderstand, for I thinke not that I can so circumspectly worke but I may be deceyued, for man cannot be so precise but he may erre, and I haue seldome heard of any the best Authours but he hath erred in some poynt: therefore in those things that he knoweth not of himselfe he muste needes follow his Author, and if his Author doe erre he must needes fall into that errour that his Author doth. And furthermore, a numbre of people there be that deuise nothing els but lies and slaunders, yea, and those which cannot attayne to any thing themselues, doe hate all those that be not ignorant as they themselues be: for the corrupt nature of manis suche, that it is a corsey to their harts that any should be commended before themselues, for generally amongst all people of the earth (whiche is innumerable) euery seuerall person thinketh himselfe most worthie, imagining themselues to haue no fellowes: suche is the Diuill in the harte of man, pampering mans hart so with pryde to thinke he hath no fellow, whereas man of himselfe is not able to do any good thing, no not to thinke one good thought, but by the only

might

might and prouidence of almighty God, therefore of our selues we can do nothyng that is good. And thus gentle Reader I make an end. If this simple and barbarous thing be taken in good parte, then looke for other of my workes shortly, and beare him good will that studieth for the benefite of his natiue countrie, desiryng God of his grace, that I and you may do that thing that may be to the laude, prayse and glory of God, to our commoditie and soules health, to the profite of our brethren, and the common wealth of this our realme.

Thus I betake you to Almightie God the creator of all things, praying him that both I & you may after this life rest in the kingdome of heauen, with Abraham, Isaac and Iacob, there to remayne world without ende.

Amen.

I. H. In commendation of the Booke.

Who so thou art that minds to passe the seas,
By Compasse, Carde, the Sunne, or starrie skie,
Marke well this worke, and gayne thereby such ease,
As shall attayne thee profite great perdie,
Such rules hath Bourne directed to thine eye,
That euen by them, if saylings art were gone,
Thou mightst by these direct thy course alone.

WHo trauels Countries gaine is worthy of great prayse:
as those ꝑ were before our time & ꝑ in sundry ways.
Whose acts do so excell, they pierce the loftie skies
that in good artes for cõmon weale, both wit & will applies
For those that were before, haue bene aduanst by fame,
by due desert, by doing well, haue merited the same.
As Authors old can tell, who list in them to rrade
who were inuẽters of the same which dayly now procede
In rule of publike weale, our loue it first began
and plast it here in all estates, for the behoofe of man.
So now thou Seaman cke, that spreadst abroad thy sayle
be thankfull for thy Author here, whiche is for thy auayle.
Whose trauaile and whose toyle is thy behoofe and gayne,
if thou dost reape what he did sow, it quiteth wel his paine,
And thankfulnesse is due, to euery liuing wight,
and doth perteyne to euery man, but yet to God by right.
To whõ be prayse for euermore, which ruleth globe & sphere,
who graunt vs grace to do his will, while we be liuing here.

FINIS.

A. R. To the Author.

WHy dost thou Bourne thy selfe bold backe
not doing what thou shouldst?
Me thinkes I heare thee Answere make
that if thou durst thou wouldst.
Whereof art thou afrayde? tell forth
to me thy doubtfull case:
To vtter truth no man there is
that ones will hide his face.

Perhaps

Perhaps thou fearſt the ſcoffing kind
of Momus bearlings beare,
Perhaps againe thou ſtandſt in doubt,
and art now daſht with feare.
To ſee theſe ſhaking quaking reedes
that bend with euery blaſt,
Loke frowning on this booke, in which
great paine beſtowd thou haſt.
Why did not then Demoſthenes
his woꝛkes hide out of ſight?
Why did not Tullie ſtay his pen,
when he began to wꝛite?
If taunting tongue of Momus then
had bene ſo rife as now
Thou thinkſt perchance they would haue feard
the ſame as well as thou.
No ſure thou art deceyud: there were
as many lightbrayners then,
As there be now in theſe our dayes
to carpe at painfull penne.
But Countries profite lo it was
that cauſed them to wꝛite,
And prayſe of good men did pꝛouoke
their woꝛkes to come to light.
And haſt not thou ſpent all the time
of wꝛiting this thy booke
Foꝛ countries ſake, to pꝛofite all
that will vouchſafe to looke
Thereon? behold what prayſe he reapt
that ſhip did firſt inuent:
It cannot be but they which reade
perceiue ſhall thine intent.
Can any deeme amiſſe of thee
that vſe of ſhip haſt told,
When ſhips inuentoꝛ gayned hath
ſuch prayſes manifold?

Doest thou not know inuention
what of it may be thought,
When vse and sauegarde of the same
there is none knoweth ought?
The Prouerbe sayth, a thing that is
to big to gripe in hand,
Can not be holden lenger than
the siefe can holde the sand.
In booke it cannot be denied
but thou hast taken payne
To set forth playne the vse of sayle
for Countries common gayne.
Although I know how odious
comparisons be still,
Be sure examples take thou mayst
and vse them at thy will.
With therefore thou example hast
of famous memorie,
Demosthenes and Tullie eke
extold vnto the skie,
Wh' excelling farre all other men
in Grecke and Latine phrase
Were subiect yet to Sicophantes
and vnder Momus blase.
Thou hast besides all this, the truth
by practise truly tride,
Whereby if any kicke at thée
they may be soone espide.
Of good men I dare boldly say
that good will thou shalt haue,
For euill of thée they none will speake,
and prayse thou doest not craue.
Therefore I wishe thee naught to feare
the force that tongues can bende
But still the worke thou hast begonne
to bryng to perfect ende.

FINIS.

| | | | January hath.xxxj.dayes. |
|---|---|---|---|
| 3 | 1 | A | Newyeres day. |
| | 2 | b | Octa. Stepha. |
| 11 | 3 | c | Octa. John. |
| | 4 | d | Octa. Inno. |
| 19 | 5 | e | Theloſopho. bi. |
| 8 | 6 | f | Twelfth day. |
| | 7 | g | Julian mart. |
| 16 | 8 | A | Seuerine biſh. |
| 5 | 9 | b | Martian Virg. |
| | 10 | c | Paule firſt her. |
| 13 | 11 | d | *Sun in Aquari.* |
| 2 | 12 | e | Satire Mar. |
| | 13 | f | Oct. Epiphani. |
| 10 | 14 | g | Iſidore martyr. |
| | 15 | A | Maurice. |
| 18 | 16 | b | Anthonie Abbot. |
| 7 | 17 | c | Marcelle biſh. |
| | 18 | d | Priſce Virg. |
| 15 | 19 | e | Mari. and his fel. |
| 4 | 20 | f | Fabian and Sa. |
| | 21 | g | Agnus virg. |
| 12 | 22 | A | Vincent mar. |
| 1 | 23 | b | Emerice. |
| | 24 | c | Timothie diſci. |
| 9 | 25 | d | Con. of Paule. |
| | 26 | e | Policarp. mart. |
| 17 | 27 | f | Chryſoſt. Doct. |
| 6 | 28 | g | Theodore. |
| | 29 | A | Valerie biſh. |
| 14 | 30 | b | Tran. of Mark. |
| 3 | 31 | c | Ciri. and Jon. |

| | | | February hath.xxviij.dayes, and in the yere of Biſſextilis.xxix.dayes. |
|---|---|---|---|
| | 1 | d | Brigit. Faſt. |
| 11 | 2 | e | Purific. of Mary. |
| 19 | 3 | f | Blaſe mart. |
| 8 | 4 | g | Gilbert confeſ. |
| | 5 | A | Agathe virgin. |
| 16 | 6 | b | Dorothe virgin. |
| 5 | 7 | c | Amandus biſh. |
| | 8 | d | Salomon. |
| 13 | 9 | e | *Sun in Piſces.* |
| 2 | 10 | f | Scther biſhop. |
| | 11 | g | |
| 10 | 12 | A | Eulale virgin. |
| | 13 | b | Valentine biſhop. |
| 18 | 14 | c | Fauſtine biſhop. |
| 7 | 15 | d | Julian virg. |
| | 16 | e | Conſtance virgin. |
| 15 | 17 | f | Simeon martyr. |
| 4 | 18 | g | Sabine Prieſt. |
| | 19 | A | |
| 12 | 20 | b | 60. Martyres. |
| 1 | 21 | c | 70. Martyres. |
| | 22 | d | Peters chayre. |
| 9 | 23 | e | Strener. Faſt. |
| | 24 | f | Mathie Apoſtle. |
| 17 | 25 | g | Poſtrar. biſhop. |
| 6 | 26 | A | Victor and his fel. |
| | 27 | b | Auguſtine biſhop. |
| 14 | 28 | c | Oſwald biſhop. |

| Marche hath.xxxj.dayes. | | | | Aprill hath.xxx dayes. | | | |
|---|---|---|---|---|---|---|---|
| 3 | 1 | d | Dauid bishop. | | 1 | g | Theodore virg. |
| | 2 | e | Basilic mart. | 11 | 2 | A | Mary Egypti. |
| 11 | 3 | f | Maxime mart. | 19 | 3 | b | Richarde bish. |
| | 4 | g | Lucius mart. | 8 | 4 | c | Ambrose bish. |
| 19 | 5 | A | Focius mart. | | 5 | d | Marci and Ma. |
| 8 | 6 | b | Vict. and Venin. | 16 | 6 | e | Sextus mart. |
| | 7 | c | Tho. de Aquin. | 5 | 7 | f | Euphemi vir. |
| 16 | 8 | d | Apoline mart. | | 8 | g | Denise mart. |
| 5 | 9 | e | 40. Martyres. | 13 | 9 | A | Perpetuus bish. |
| | 10 | f | Gregorie bishop. | 2 | 10 | b | Marcus mart. |
| 13 | 11 | g | *Sun in Aries.* | | 11 | c | *Sun in Taurus.* |
| 2 | 12 | A | Zacharie bish. | 10 | 12 | d | Appoline mart. |
| | 13 | b | Longine mart. | | 13 | e | Sother martyr. |
| 10 | 14 | c | Patricius bish. | 18 | 14 | f | Tyburt mart. |
| | 15 | d | Gertrude vir. | 7 | 15 | g | Osmond bishop. |
| 18 | 16 | e | Anselme. | | 16 | A | Isidore bishop. |
| 7 | 17 | f | Edward king. | 15 | 17 | b | Anicete bishop. |
| | 18 | g | Joseph. spon. | 4 | 18 | c | Eluther bishop. |
| 15 | 19 | A | Cutbert bishop. | | 19 | d | Tiburtius con. |
| 4 | 20 | b | Benedict. Ab. | 12 | 20 | e | Hermogenes. |
| | 21 | c | Astrodose bishop. | 1 | 21 | f | Quintine. |
| 12 | 22 | d | Pigment bish. | | 22 | g | Clete bishop. |
| 1 | 23 | e | Theodore. | 9 | 23 | A | Gorge mart. |
| | 24 | f | Fast. | | 24 | b | Wilfride con. |
| 9 | 25 | g | Annun of Mary. | 17 | 25 | c | Marke Euan. |
| | 26 | A | Castore mart. | 6 | 26 | d | Anastace bish. |
| 17 | 27 | b | John Heremi. | | 27 | e | Vitalis mart. |
| 6 | 28 | c | Dorothe mart. | 14 | 28 | f | Peter of Mi. |
| | 29 | d | Eustace. | 3 | 29 | g | Clete bishop. |
| 14 | 30 | e | Sabine vir. | | 30 | A | Dep. of Erker. |
| 3 | 31 | f | Balbine vir. | | | | |

May.

| | | | May hath.xxxj.dayes. |
|---|---|---|---|
| 11 | 1 | b | Philip and iacob. |
| | 2 | c | Athanasius bish. |
| 19 | 3 | d | Inu. of the crosse. |
| 8 | 4 | e | Thristopher. |
| | 5 | f | S. Augustine. |
| 16 | 6 | g | John port lat. |
| 5 | 7 | A | John of Beuer. |
| | 8 | b | Appe. of Pich. |
| 13 | 9 | c | Transl. of Ni. |
| 2 | 10 | d | Gordiane. |
| | 11 | e | *Sun in Gemini.* |
| 10 | 12 | f | Victorius mart. |
| | 13 | g | Seruacius conf. |
| 18 | 14 | A | Boniface mart. |
| 7 | 15 | b | Sophia virgin. |
| | 16 | c | Brandon bishop. |
| 15 | 17 | d | Transl. of Bar. |
| 4 | 18 | e | Dioscor. mart. |
| | 19 | f | |
| 12 | 20 | g | Dunstan con. |
| 1 | 21 | A | Barnardine. |
| | 22 | b | Helene queene. |
| 9 | 23 | c | Petronill. |
| | 24 | d | Julian virg. |
| 17 | 25 | e | Desiderie mart. |
| 6 | 26 | f | Dorime conf. |
| | 27 | g | |
| 14 | 28 | A | Germaine bish. |
| 3 | 29 | b | Necromede. |
| | 30 | c | Cyrone martyr. |
| 11 | 31 | d | Felix bishop. |

| | | | June hath xxx.dayes. |
|---|---|---|---|
| 19 | 1 | e | Nicodeme. |
| 8 | 2 | f | Erasmus. |
| | 3 | g | Basill. |
| 16 | 4 | A | Marcel. martyr. |
| 5 | 5 | b | Petrocius con. |
| | 6 | c | Boniface bish. |
| 13 | 7 | d | Medard and Gil. |
| 2 | 8 | e | Transl. Edmond. |
| | 9 | f | Puan conf. |
| 10 | 10 | g | Tran. of Mol. |
| | 11 | A | Barnabe Apo. |
| 18 | 12 | b | *Sun in Taurus.* |
| 7 | 13 | c | Anthonie conf. |
| | 14 | d | Basilides conf. |
| 15 | 15 | e | Vate modeste. |
| 4 | 16 | f | Transl. Richar. |
| | 17 | g | Botulphe conf. |
| 12 | 18 | A | Emperie bish. |
| 1 | 19 | b | Gerualius mar. |
| | 20 | c | Transl. Edmar. |
| 9 | 21 | d | Walburge virg. |
| | 22 | e | Albane mart. |
| 17 | 23 | f | Fast. |
| 6 | 24 | g | Iohn baptist. |
| | 25 | A | Transl of Elig. |
| 14 | 26 | b | John and Pa. |
| 3 | 27 | c | Crescent mart. |
| | 28 | d | Fast. |
| 11 | 29 | e | Peter and Paule. |
| | 30 | f | |

| Iuly hath.xxxj.dayes. | | | | August hath.xxxj dayes. | | | |
|---|---|---|---|---|---|---|---|
| 19 | 1 | g | Octa. John Bap. | 8 | 1 | c | Lammas. |
| 8 | 2 | A | Visit. of Mary. | 16 | 2 | d | Steuen bishop. |
| | 3 | b | Gregorie bishop. | 5 | 3 | e | Finding of Ste. |
| 16 | 4 | c | Domitius mart. | | 4 | f | Justine Priest. |
| 5 | 5 | d | Parthene con. | 13 | 5 | g | Festum niuis. |
| | 6 | e | Procope mart. | 2 | 6 | A | Trans. domi. |
| 13 | 7 | f | Zenone mart. | | 7 | b | Feast of Jesu. |
| 2 | 8 | g | Paternian Bish. | 10 | 8 | c | Cirack. & his fel. |
| | 9 | A | Pius bishop. | | 9 | d | Roman mart. |
| 20 | 10 | b | Dog dayes be. | 18 | 10 | e | Laurence mart. |
| | 11 | c | Hermaeo. sor. | 7 | 11 | f | Tiburt and Su. |
| 18 | 12 | d | Anaclete. bishop. | | 12 | g | Clare virgin. |
| 7 | 13 | e | Quirine and Ju. | 15 | 13 | A | Ypolite virgin. |
| | 14 | f | *Sun in Leo.* | 4 | 14 | b | *Sun in Virgo.* |
| 15 | 15 | g | Marine Vir. | | 15 | c | Assump. of Mary. |
| 4 | 16 | A | Symph. cum. 7. | 12 | 16 | d | Roche confess. |
| | 17 | b | Arlene herem. | 1 | 17 | e | Octa. Laurence. |
| 12 | 18 | c | Praxede vir. | | 18 | f | Agapite mart. |
| 1 | 19 | d | Margar. vir. | 9 | 19 | g | Lewes bishop. |
| | 20 | e | Praxede vir. | | 20 | A | Dog dayes ende. |
| 9 | 21 | f | Appoline bishop. | 17 | 21 | b | Anastase mart. |
| | 22 | g | Mary Magda. | 6 | 22 | c | Timo. and Hip. |
| 17 | 23 | A | Christian. | | 23 | d | Eleazor. Fast. |
| 6 | 24 | b | Fast. | 14 | 24 | e | Barthol. Apostle. |
| | 25 | c | Iames Apostle. | 3 | 25 | f | Lewes king. |
| 14 | 26 | d | Anne mo. of Ma. | | 26 | g | Zepherine bish. |
| 3 | 27 | e | Panthaleon. | 11 | 27 | A | Rufus mar. |
| | 28 | f | Sampson bish. | 19 | 28 | b | Augustine bish. |
| 11 | 29 | g | Marie virgin. | | 29 | c | Johns behead. |
| | 30 | A | Abbon and Sen. | 8 | 30 | d | Felix and Audact. |
| 19 | 31 | b | German bishop. | | 31 | e | Cuthbur. virg. |

Septem.

| September hath.xxx dayes. | | | | October hath xxxj.dayes. | | | |
|---|---|---|---|---|---|---|---|
| 16 | 1 | f | Giles Abbot. | 16 | 1 | A | Remigius bi. |
| 5 | 2 | g | Anthony mart. | 5 | 2 | b | Leodegare mar. |
| | 3 | A | Eupheme. | 13 | 3 | c | Cantide mar. |
| 13 | 4 | b | Moyses Pro. | 2 | 4 | d | Francis mart. |
| 2 | 5 | c | Venturine. | | 5 | e | Faith virgin |
| | 6 | d | Zacharie pro. | 10 | 6 | f | Gerionis. |
| 10 | 7 | e | Enurce bishop. | | 7 | g | Marce and Mar. |
| | 8 | f | Natiuitie of Ma. | 18 | 8 | A | Apolinaris mar. |
| 18 | 9 | g | Gorgone mart. | 7 | 9 | b | Pelagi virgin. |
| 7 | 10 | A | Nicholas de Tol. | | 10 | c | Linus conf. |
| | 11 | b | Protece and Hi. | 15 | 11 | d | Denice & his fe. |
| 15 | 12 | c | Sire bishop. | 4 | 12 | e | Nichasius bish. |
| 4 | 13 | d | Philip bishop. | | 13 | f | Wilfride bish. |
| | 14 | e | *Sun in Libra.* | 12 | 14 | g | *Sun in Scorpio.* |
| 12 | 15 | f | Nicomede priest. | 1 | 15 | A | Calixt bishop. |
| 1 | 16 | g | Edith vir. | | 16 | b | Wolfran. bish. |
| | 17 | A | Lambart bishop. | 9 | 17 | c | Micha. of the mo. |
| 9 | 18 | b | Victor and Coro. | | 18 | d | Luke Euange. |
| | 19 | c | Eustace. | 17 | 19 | e | Etheldred virg. |
| 17 | 20 | d | Fast. | 6 | 20 | f | Frideswide vir. |
| 6 | 21 | e | Mathew Apostle. | | 21 | g | Austrebert virg. |
| | 22 | f | Maurice. | 14 | 22 | A | xi.M. virgins. |
| 14 | 23 | g | Line Mart. | 3 | 23 | b | Mary Salome. |
| 3 | 24 | A | German Abbot. | | 24 | c | Romaine bishop. |
| | 25 | b | Cleophin and Ap. | 11 | 25 | d | Maglore bish. |
| 11 | 26 | c | Ciprian and Ju. | | 26 | e | Crispi and Cris. |
| 19 | 27 | d | Cosme and Da. | 19 | 27 | f | Fast. |
| | 28 | e | Exupere bishop. | 8 | 28 | g | Simon and Iude. |
| 8 | 29 | f | Michaell arch. | | 29 | A | Narcissus bish. |
| | 30 | g | Hieronie doct. | 16 | 30 | b | Germaine conf. |
| | | | | 5 | 31 | c | Fast. |

| | | | November hath. xxx. dayes. |
|---|---|---|---|
| | 1 | f | All Saincts. |
| 13 | 2 | g | All Soules. |
| 2 | 3 | A | Wenefride virg. |
| | 4 | b | Amantius. |
| 10 | 5 | c | Lete priest. |
| | 6 | d | Leonard. |
| 18 | 7 | e | Wilbrode. |
| 7 | 8 | f | Fower crouned. |
| | 9 | g | Theodore. |
| 15 | 10 | A | Parime. |
| 4 | 11 | b | Martine bishop. |
| | 12 | c | Brise bishop. |
| 22 | 13 | d | *Sun in Sagit.* |
| 1 | 14 | e | Tran. Erkenw. |
| | 15 | f | Macute bishop. |
| 9 | 16 | g | Dep. of Edmond. |
| | 17 | A | Ini reg. Eliza. |
| 27 | 18 | b | Octa. Martine. |
| 6 | 19 | c | Elizabeth mart. |
| | 20 | d | Edmond king. |
| 14 | 21 | e | Pres. of Mary. |
| 3 | 22 | f | Cicili virgin. |
| | 23 | g | Clement mart. |
| 11 | 24 | A | Crisogon mart. |
| 19 | 25 | b | Katharine virgin. |
| | 26 | c | Line mart. |
| 8 | 27 | d | Vitales conf. |
| | 28 | e | Rufus mart. |
| 16 | 29 | f | Saturni. Fast. |
| 5 | 30 | g | Andrew Apostle. |

| | | | December hath xxxj. dayes. |
|---|---|---|---|
| | 1 | f | Elegi bishop. |
| 13 | 2 | g | Liban mart. |
| 2 | 3 | A | Dep. of Osmo. |
| | 4 | b | Barbara virg. |
| 10 | 5 | c | Sabba bishop. |
| | 6 | d | Nicholas bish. |
| 18 | 7 | e | Octa. Andrew. |
| 7 | 8 | f | Con. of Mary. |
| | 9 | g | Cyprian bish. |
| 15 | 10 | A | Eulalie vir. |
| 4 | 11 | b | Antippe. |
| | 12 | c | Damase con. |
| 22 | 13 | d | *Sun in Capricor.* |
| 1 | 14 | e | Nicasius vir. |
| | 15 | f | Othelie vir. |
| 9 | 16 | g | O Sapientia. |
| | 17 | A | Lazarus con. |
| 17 | 18 | b | Gracian bish. |
| 6 | 19 | c | Venetia vir. |
| | 20 | d | Fast. |
| 14 | 21 | e | Thomas Apost. |
| 3 | 22 | f | iiii. Martyrs. |
| | 23 | g | Victor virg. |
| 11 | 24 | A | Fast. |
| 19 | 25 | b | Christmas day. |
| | 26 | c | Stephen mart. |
| 8 | 27 | d | Iohn Euang. |
| | 28 | e | Innocents day. |
| 16 | 29 | f | |
| 5 | 30 | g | Tran. of Jame. |
| 13 | 31 | A | Siluester mart. |

## A Table or Kalender for .30. yere, ſhevving the Prime, the Sundays letter, and Leape yere, and the mouable Feaſts, as the firſt Sunday in Lent, and Eaſter day, Aſſention day, and VVhitſonday.

| The Yere of our Lorde. | The prime. | Dominicall letter. | Firſt ſunday in Lent. | Eaſter day. | Aſſention day. | VVhitſonday. |
|---|---|---|---|---|---|---|
| 1574. | 17 | c | 28. Febꝛ. | 11. Apꝛil. | 20. May. | 30. May. |
| 1575 | 18 | b | 20. Febꝛ. | 3. Apꝛill. | 12. May. | 22. May |
| 1576 | 19 | Ag | 11. March. | 22. Apꝛil | 31. May. | 10. June |
| 1577 | 1 | f | 24. Febꝛ. | 7. Apꝛill | 16. May | 26. May |
| 1578 | 2 | e | 16. Febꝛ. | 30. Mar. | 8. May | 18. May |
| 1579 | 3 | d | 8. March. | 19. Apꝛil | 28. May | 7. June |
| 1580 | 4 | c b | 20. Febꝛ. | 3. Apꝛill | 13. May | 22. May |
| 1581 | 5 | A | 12 Febꝛ. | 26. Mar. | 4. May | 14. May |
| 1582 | 6 | g | 4. March. | 15. Apꝛil | 24. May | 3. June |
| 1583 | 7 | f | 17. Febꝛ. | 31. Mar. | 9. May | 19. May |
| 1584 | 8 | e d | 8. March. | 19. Apꝛil | 28. May | 7. June |
| 1585 | 9 | c | 28. Febꝛ. | 11. Apꝛill | 20. May | 30. May |
| 1586 | 10 | b | 20. Febꝛ. | 3. Apꝛill. | 12. May | 22. May |
| 1587 | 11 | A | 5. March. | 16. Apꝛil | 25. May | 4. June |
| 1588 | 12 | g f | 24. Febꝛ. | 7. Apꝛill | 16. May | 26. May |
| 1589 | 13 | e | 16. Febꝛ. | 30. Mar. | 8. May | 18. May |
| 1590 | 14 | d | 8. March. | 19. Apꝛil | 28. May | 7. June |
| 1591 | 15 | c | 21. Febꝛ. | 4. Apꝛill | 13. May | 23. May |
| 1592 | 16 | b A | 12. Febꝛ. | 26. Mar. | 4. May | 14. May |
| 1593 | 17 | g | 4. March. | 15. Apꝛil | 24. May | 3. June |
| 1594 | 18 | f | 17. Febꝛ. | 31. Mar. | 9. May | 19. May |
| 1595 | 19 | e | 9. March | 20. Apꝛil | 29. May | 8. June |
| 1596 | 1 | d c | 28. Febꝛ. | 11. Apꝛill | 20 May | 30. May |
| 1597 | 2 | b | 13. Febꝛ. | 27. Mar. | 4. May | 15. May |
| 1598 | 3 | A | 5. March | 16. Apꝛil | 25. May | 4. June |
| 1599 | 4 | g | 25. Febꝛ. | 8. Apꝛill | 17. May | 27. May |
| 1600 | 5 | f e | 9. Febꝛ. | 23. Mar. | 1. May | 11. May |
| 1601 | 6 | d | 1. March | 12. Apꝛil | 21. May | 31. May |
| 1602 | 7 | c | 21. Febꝛ. | 4. Apꝛill | 13. May | 23. May |
| 1603 | 8 | b | 13. March. | 24. Apꝛil | 2. June. | 12. June. |

For that the common people do fall into suche a numbre of errours as touching the length of the day, holding an opinio that in euery.15. dayes, the day is an houre longer or shorter, the truth is this: the day dothe kæpe no suche proporion in the lengthening and shorting, but dothe length and shorte according vnto the swiftnesse and the slowenesse of the sunnes declination, for when the Sunne hath swifte declination, then doth the day lengthen and shorten apace: and when that the Declination is slowe, then dothe the day lengthen or shorten but slowly. And yet the most parte of the common people do holde an opinion, that at Christmasse or els at New yeares day at the furthest the day must needes be an houre longer, & yet the Sunne hath not declined or come towardes the Equinoctiall.2.degrees and a halfe, whiche will not make halfe an houre in the length of the day. Wherefore I do thinke it good to declare howe the whole yeare when the day is an houre longer or shorter here in this place for the Latitude or heigth of the pole Artick at London, the Pole beyng rayled.51. degrees and.32. minutes, or.34. minutes: and our longest Somer day is.16. houres and a halfe, and our shortest winter day is.7. houres and a halfe from the rising of the Sunne vnto the setting of the Sunne: and firste this, the shortest winter day is the.11.or.12. day of December, and then the Sunne riseth a quarter of an houre after. 8. and setteth a quarter of an houre before.4. of the clocke, and then the Sunne hath his greatest declination vnto the Southwardes. And then the.29. day of December the day is a quarter of an houre longer, then riseth the Sunne at.8. of the clocke and setteth at.4. And then the 17.or.18 of Januarie the day is an houre longer and not before, for the Sunne must be declined from hir Solstick of winter.5. degrees and.12. minuts before the day is lengthned an houre, so that I do affirme, that from the.4.or.5. day of November, vnto the.17.or.18. day of January, in all that time the day is but one houre shorter and longer, which is the time of 10. weekes. And then the. 27.or. 28. of Januarie the night is 5. houres long, then riseth the Sunne half an houre after.7.

and

and setteth halfe an houre after foure of the clocke. And then the. 11. or. 12. day of Februarie the day is. 10. houres long, then riseth the Sunne at. 7. and setteth at. 5. of the clocke. And then the. 26. day of Februarie the day is. 11. houres long, then riseth the Sunne halfe an houre after. 6. and setteth halfe an houre after. 5. of the clocke. And then the. 11. day of Marche the sunne is vpon the Equinoctiall and the day iuste. 12. houres long all the worlde ouer. And then the. 24. day of Marche the day is. 13. houres long, and then riseth the Sunne halfe an houre before 6. and setteth halfe an houre after. 6. of the clocke. And then the. 7. day of Aprill the day is. 14. houres long, and then riseth the Sunne at. 5. of the clocke iuste, and setteth at. 7. of the clocke iuste. And then the. 23. day of Aprill the day is. 15. houres long, and there riseth the Sunne halfe an houre before. 5. and setteth halfe an houre after. 7. of the clocke. And then the. 15. day of Maye the day is. 16. houres long, then riseth the Sunne at. 4. of the clocke and setteth at. 8. of the clocke iuste. And then the. 11. of June the Sunne hath hir greatest declination to the Northwarde, and then is our longest Somer dayes, and then it is. 16. houres and a halfe from the Sunne rising vnto the Sunne setting, so that the Sunne riseth a quarter of an houre before. 4. and setteth a quarter of an houre after eight of the clocke. And then the. 10. day of Julie the day is. 16. houres long, then riseth the sunne at. 4. and setteth at. 8. of the clocke. And then the laste of July the day is. 15. houres long. And then the. 16. day of Auguste the day is. 14. houres long. And then the laste day of Auguste the day is. 13. houres long. And then the. 13. or. 14. of September the sunne is vpon the Equinoctiall, and the day iuste. 12. houres long. And then the. 27. day of September the day is. 11. houres long. And then the. 11. of October the day is. 10. houres long. And then the. 26. day of October the day is. 9. houres long. And then the. 15. day of Nouember the day is. 8. houres long, and so vnto the. 11. or. 12. of December, and then the day is at the shortest (as before is declared.) Thus much haue I sayde as touching the length of the day by euen houres, whiche some people will haue at

the entrance of the Sunne into the.12. signes, of which in the lengthing and shorting of the day there is no such matter, but onely this woke, when that the Sunne hath declined.5. degrees and.12.minutes in this our Latitude, then is the day an houre longer or shorter, as you shall finde this matter more largelier spoken of in all places throwoe the worlde, in the.11. chapter of the booke.

## Faultes escaped in the Printing.

Fol.2.b.lin.30. after oblique, leaue out equinoctiall, fol.8. b. lin.30. for crolling in, reade crolling the equinoctiall in, fol.3. a.lin.3.for.21. read.12. fol.eod.lin.10.for respectes,read aspects, fol.3.b.lin.18 for placing,read pelling,fol.9.a.lin.11.for Northeast, read Northwest, fol.12.b. lin. 20. for rarer, read rather fol.13.a.lin.22.for Nas,read Naale, fol.28.b.lin.2.for pointes, read pointers, fol.35.b.lin.11. for bacula, read Bacula, fol.41. a.lin.13.for North North,read North Northeast,fol.42.b.lin. 24. for.250.read.2500. fol.43.a. lin.15. for whiche are, reade with vs, fol.45.a.lin.20.for nowe,read Rome,fol.eod.lin.24. for a quarter,read.3.quarters, fol.46.a.lin.13. for.52.read.53. fol.eod.lin.15.for 15.read.17. fol.47.a.lin.penult.for treating, reade,trenting, fol.48.a.lin.24.for whole,read holde, fol.eod. b.lin.3.for middle of the, read middlemost, fol.52.a.lin.13. for post,read part.

# ¶ A Table of the reigne of Kings since the Conquest.

| Number of Kings and Queenes. | The names of the Kings of England. | Beginning of their Reigne. | Time of their death. | The place of their buriall. |
|---|---|---|---|---|
| 1 | William Conqueror. | 14. Oct. | 9. Sept. 1087 | Caen in Norm. |
| 2 | William Rufus. | 9. Sept. | 1. Auguſt. 1100 | Weſtminſter. |
| 3 | Henry the firſt. | 1. Aug. | 2. Decēb. 1136 | Reding. |
| 4 | Stephan. | 2. Dece. | 25. Octob. 1154 | Feuerſham. |
| 5 | Henry the ſecond. | 25 Octo. | 6. July. 1189 | Fontenerard. |
| 6 | Richard the firſt. | 6. Julie. | 6. Aprill. 1199 | Fontenerard. |
| 7 | John. | 6. Aprill | 19. Octob. 1216 | Worceſter. |
| 8 | Henry the third. | 19. Octo | 16. Nou. 1272 | Weſtminſter. |
| 9 | Edward the firſt. | 16. Nou. | 6. July. 1307 | Weſtminſter. |
| 10 | Edward the ſecond. | 6. July. | 25. Janu. 1327 | Gloceſter. |
| 11 | Edward the third. | 25. Jan. | 21. Juns. 1377 | Weſtminſter. |
| 12 | Richard the ſecond. | 21 June. | 16. Sep. 1400 | Weſtminſter. |
| 13 | Henry the fourth. | 16. Sep. | 20. Mar. 1413 | Canterbury. |
| 14 | Henry the fifth. | 20. Mar. | 31. Augu. 1422 | Weſtminſter. |
| 15 | Henry the firſt. | 31. Aug. | 4. Mar. 1461 | Windeſor. |
| 16 | Edward the fourth. | 4. Mar. | 9. Aprill. 1483 | Windeſor. |
| 17 | Edward the fifth. | 9. Aprill | 22. June. 1484 | Weſtminſter. |
| 18 | Richard the third. | 22. June | 22. Aug. 1486 | Leceſter. |
| 19 | Henry the ſeuenth. | 22 Aug. | 22. April. 1509 | Weſtminſter. |
| 20 | Henry the eyght. | 22. Aprill | 28. Janu. 1547 | Windeſor. |
| 21 | Edward the ſixt. | 28. Jan. | 6. July. 1553. | Weſtminſter. |
| 22 | Queene Mary. | 6. July | 17. Nou. 1559 | Weſtminſter. |
| 23 | Queene Elizabeth. | 17. Nou. | | |

## ¶ A profitable and neceſſarie rule to knovv the beginning and ending of euery Terme, with their returnes.

Hillarie Tearme, beginneth the.xxij. of Januarie, if it be not Sunday, whiche then is referred vntill the next day after, and endeth the.xij. of Febʒuary, and hath foure returnes, that is to ſaye:

Octauis Hillarij. } Craſtino Purific.
Quind. Hillarij. } Octauis Purific.

Eaſter Tearme, beginneth.xvj. dayes after Eaſter, and endeth the Monday nexte after the Aſcention day, and hath fiue returnes, that is to ſay:

Quind. Paſch. } Menſe Paſchæ. } Quinque Paſchæ.
Tres Paſchæ. } Craſt. Aſcention.

Trinitie Tearme, beginneth the friday next after Trinity ſunday, and endeth the wedneſday foʒtnight after, and hath foure returnes, that is to ſay:

Craſt. Trinitati. } Quind. Trinitat.
Octauis Trinita. } Tres Trinitat.

Michaelmas Tearme, beginneth the.9. day of October, if it be not Sunday, and endeth the.xxviij. oʒ.x; ix. of Nouember, and hath eyght returnes, that is to ſay:

Octauis Micha. } Craſt. Anima.
Quind. Michae. } Craſt. Martini.
Tres Michaelis. } Octa. Martini.
Menſe Michael. } Quind. Martini.

*Note alſo that the Eſchequer openeth eyght dayes before any Tearme begin, except* Trinitie *Tearme which openeth but foure dayes before.*

Thirtie dayes hath September: Apryll, Iune, and Nouember.
Februarie hath.xxviij. alone: and all the reſt thirtie and one.

Except the leape yeare, wherin Febʒuarie hath.xxix.

# ¶ An Introduction vnto the Regiment for the Sea.

The names of certaine things neceſſarie to be known of them that are Mariners or Seafaring men, meete to bee knowne of them that doe practiſe Nauigation, as this: the names of the circles of the Sphere, and what they are, and their vſes: and alſo the names of other things belonging therevnto, and what they are, and their vſes.

## Firſt vvhat the Horizon circle is.

THe Horizon is the parting of the earthe or the Sea and the ſkye, that is to ſay, the halfe of the heauens being aboue ouer your heade, and the other halfe hidden with the earth or Sea vnder them: and this Horizon circle dothe moue as you doe moue: for as you doe by trauell chaunge your place, ſo doth the Horizon chaunge in all points.

## The vſe of the Horizon circle.

THe vſe of the Horizon circle is this, to take the height of the Sunne or any ſtarre, with the croſſe ſtaffe, ſetting the one ende with the Horizon, and the other ende with the Sunne or ſtarre, ſo that you haue a true Horizon: and that muſt be done vpon the Sea, or elſe it muſt be a very playne grounde vpon the toppe of a hill, elſe it is no true Horizon. And alſo if the Sunne or Moone, or any ſtarre be to be ſæne, thē they be aboue the Horizon: if they be not to be ſæne, then they be vnder the Horizon.

## 2. VVhat the Meridian circle is.

THe Meridian is a circle beginning due South, and ſo paſſing by youre Zenith that is right ouer the crowne

of your head, and so by the two Poles of the worlde: and if you doe travell due South and North, you doe not chaunge youre Meridian: but in the going or travelling any other way, you do chaunge it.

### The vse of the Meridian circle.

THe vse of the Meridian circle is, to knowe the iust tyme of noone by the Sunne: for as sone as the middle of the Sunne is vpon the Meridian, then it is noone, and when the Sunne, Moone, or any Star is vpon the Meridian, then they be farthest from the Horizon, and it is a meete time to take their heigth for to know the altitude or heigth of the Pole of the worlde, whereby you may perfitly knowe howe farre you be to the Southwardes or Northwardes of any place.

## 3. VVhat the Equinoctiall circle is, being a Paralell line or circle fixed.

THe Equinoctiall is a fixed circle in the Heauens equally distant from both the Poles, and doth passe directly ouer the middle of the earth rounde about, and is called the Equinoctiall, for that if the Sunne be there, then throwe all the whole world the Sunne is twelue houres aboue the Horizon, and twelue houres vnder the Horizon sauing vnder the two Poles, and there the Equinoctiall is with the Horizon. So they shal se half the Sunne and no more, till the Sunne be departed from the Equinoctiall. And also to them that do inhabite or dwell in any place vnder the Equinoctiall, the Sunne, Moone, and all the Starres be twelue hours aboue the Horizon, and twelue houres vnder the Horizon.

### The vse of the Equinoctiall circle.

THe vse of the Equinoctiall, is to knowe what declination the Sunne or any other Starre hath from it, and of whiche side, and by that is known the heigth of the Equinoctial,

and

and by the heigth of that is knowen the heigth of either of the two Poles of the worlde.

4 VVhat the circle or Tropicke of Cancer is, being a Paralell circle fixed.

THe Tropicke of Cancer is the greateſt declination that the Sunne doth come vnto the Northwardes, and then is our longeſt Sommer dayes, and ſhorteſt nights.

5. VVhat the circle or Tropick of Capricorne is, being a Paralell circle fixed.

THe Tropicke of Capricorne, is the greateſt declination that the ſunne doth go vnto the Southwardes, and then is our ſhorteſt Winter dayes, and longeſt nights.

The vſes of theſe two circles be but ſmal, but that the dayes beeing at the longeſt or ſhorteſt, the Sunne dothe returne backe againe. &c.

6. VVhat the Articke circle is, beeing a Paralell circle.

THe Articke circle doth touch the Horizon due North, and is according to the place that you are in, of any place vpon the face of the earth, and doth wyden and narrow according vnto the altitude or heigth of the Pole: for as you doe goe vnto the South partes, then dothe your Articke circle growe narower and narower, vntill you come right vnder the Equinoctiall line, and then haue you no Articke circle: and if that you do goe vnto the North partes, then doth your Articke circle growe wider and wider: and where the North Pole is rayſed. 66. degrees and a half, there the Artick circle is iuſt with the Tropick of Cancer, and then vnder the north Pole, there your Artick circle is with the Equinoctial.

The vſe of the Articke circle.

THe vſe of the Articke circle, is to knowe what Starres doe neuer ſet vnto you, for all thoſe Starres or lyghtes that you doe ſee vnder the Pole, doe not ſet: and if that you bee vnto the North wardes, of the height of the Pole, more

than. 66. degrees and a halfe: if that the Sunne or Moone be in the Tropick of Cancer, they shall not goe downe vnto you vnder the Horizon, but shall bee still in sighte vnto you, so that they be not let by the cloudes and other accidentes.

7. VVhat the Antarticke circle is, beeing a Paralell circle.

THe Antarticke circle doth touch the Horizon due South, and is opposite or right agaynste the Articke circle, and dothe wyde and narrowe in all poyntes, and dothe not differ from the Articke circle, sauing the Articke circle is aboue the Horizon, and the Antartike circle is vnderneath the Horizon.

The vse of the Antarticke circle.

THe vse of the Antarticke circle is as the Articke is in all poyntes, to knowe what starres will not appeare aboue your Horizon, and in like manner, to the Northwardes of 66. degrees and a halfe, (the Sunne or Moone being in the Tropicke of Capricorne) then they will not ryse aboue the Horizon.

8. VVhat the Zodiacke is, beeing a circle.

THe Zodiacke is the greatest circle in all the Heauens, wherein all the wandering lightes or Planets doe keepe they? courses, that is to say, the Sunne and Moone, and the other fiue Planets or Starres, that is to say, Saturne, Iupiter, Mars, Venus, and Mercury. &c. whiche circle is deuided into twelue equall partes, called the twelue singes, as Aries, Taurus, Gemini, Cancer, Leo, Virgo, Libra, Scorpio, Sagitarius, Capricornus, Aquarius, Pisces, the which circle standeth oblique equinoctiall or awrye, crossing in the middle at two places: the Northermost parte is the middle of the Zodiacke, and that is the Tropicke of Cancer: and the Southermost

moſt parte is the tropicke of Capricorne, the very midle of the zodiack: and that line in the midle of the zodiack, is called the ecliptick lyne, and the zodiack is. 21. degrees broade, that is to ſay, fiue degrees from the ecliptick line vnto the north parts, and fiue degrees vnto the South parts.

The vſe of the Zodiack.

The vſe of the Zodiack is, through the mouing of the Sunne and Mone & the other planets, to know in what ſigne they be, and alſo to know the time of the chaunge of the Mone, with all the other reſpectes: and in like manner to know the aſpects of all the other planets vnto the Mone, and alſo the planets amongſt themſelues: and by the aſpectes in the. 12. ſignes is gathered their effects, and in what countrey it may happen.

9. VVhat the line Ecliptick is.

The line ecliptick, is a circle in the very middle of the Zodiack, the whiche the very midle or center of the Sunne doth go vpon.

The vſe of the line Ecliptick.

The vſe of the line Ecliptick is this, if that the Mone or any other ſtarre be vnto the North part therof, then it is ſayd that they haue North latitude, and if vnto the Southe part, then they haue ſouth latitude: and alſo by this circle called the line ecliptick, is knowne the eclipſe of the Sunne and the Mone.

10. VVhat the artick polare circle is, being a paralell circle fixed.

The artick polare circle is made by the pole of the Zodiack, or pole of the circle ecliptick. 23. degrees and a halfe in the heauens from the poles of the world aboue the horizon.

11. VVhat the antartick Polare circle is, being a Paralell circle fixed.

THe antartick Polare circle is iuſt oppoſite vnto ꝑ artick polare, made by the antartick pole vnderneath our horizon. The vſe of them I will declare, when I ſpeake of the poles of the Ecliptick or Zodiack.

12. VVhat the two circles called Colures be. &c.

THe. 2. circles called Colures, be thoſe that do deuide the Zodiack, and all the other paralell circles into. 4. equall parts, the one of the circles doth croſſe the Zodiack in the firſt point of Aries and Libra, and ſo paſſeth by the. 2. poles of the world, and is called the equinoctiall colure: and the other colure circle doth croſſe the Zodiacke in the firſte pointe of Cancer and Capricorne, and ſo paſſeth the. 2. poles of the world, and there at the. 2. poles the one circle doth croſſe the other: and that is called the Solſtitiall colure.

The vſe of theſe two circles.

THe vſe of the. 2. colure circles is this, the Sunne placing by them doth deuide the yeare into. 4. partes: as this, the Sunne in the firſt point of Aries, is Spring time. &c.

13. VVhat the. 2. Poles of the world is, imagined to be as an axiltree.

THe. 2. poles of the world, imagined to be as an axiltree, (that is to ſay, the North pole called the pole artick, and the South pole called the pole antartick) the one is directly againſt the other: the North pole alwayes aboue our horizon, and the South pole antartick always vnder our horizon, being fixed faſt in the heauens, and the equinoctiall iuſt and equally betweene them: and the cauſe why that it is imagined to be an axiltree is thys, for that the whole heauens and all the lyghters of the Firmamente be caried rounde aboute from the Eaſt vnto the Weſt in. 24. houres: ſo that

ſo that no light nor place remayneth vnremoued, but onely the .2. poles of the world.

The vſe of the Poles of the world.

THe vſe of the .2. Poles, is this, to knowe how farre we do tranſporte our ſelues, and to know what climate, and temperatneſſe we be in as touching heate and colde.

14. VVhat the .2. Poles of the Zodiack is, imagined to be an axiltree in the heauens.

THe .2. Poles of the Zodiack, or Ecliptick, imagined to bee as an axiltree, (the artick pole of the Zodiack, or rather the Ecliptick, and the Antartick pole of the Zodiack) the one being directly againſte the other, and the Zodiack or rather the middle thereof, called the ecliptick, to be iuſt or equall betweene them, are called the Poles of the Zodiacke: for that the Sunne and the Mone, and the other planets and fixed ſtarres do moue vnto the eaſtward, according to the ſtanding of the Zodiack. &c.

The vſe of the Poles of the Zodiack.

THe vſe of the two Poles of the Zodiack is this, (as it is before declared) that the Zodiack is deuided into .12. equall partes, called the .12. ſignes, and thoſe diuiſions by imagination do paſſe vnto the poles of the Zodiack, in ſuche forme as the meridian lynes do all meete at the poles of the world, and ſo do all thoſe diuiſions meete at the two poles of the Zodiack, and then any ſtarre, that is out of the Zodiack, eyther vnto the ſouthwards, or northwardes, (according vnto thoſe diuiſions) they be called in the ſignes.

15. VVhat the Zenith or verticall point is, imagined to be as an axiltree.

The

THe Zenith or vertical point, is imagined to be a pricke in the heauens right ouer the crowne of your head, and is moueable as we our selues be, and is as an axiltree vnto the horizon circle: and as you do transport your selfe from one place vnto another, so doth your Zenith or verticall poynte, and your horizon circle also.

The vse of the Zenith or verticall poynt. &c.

THe vse of the Zenith or verticall point is this, to knowe howe nere or farre off any starre is from your zenith, by taking the true heigth of any starre with an instrumente, for that from your zenith is always. 90. degrees down vnto the horizon on euery side round about you, as it shall more plainely appeare hereafter where I speake of degrees.

16. VVhat a Degree is.

A Degree is the part or diuision of a whole circle, into. 360. equall parts, how bigge or smal soeuer the circle be.

The vse of the Degrees is manyfold.

THe vse of the degrees is to knowe by the Sunne and Moones course in the zodiack, or any other of the planets or mouable starres, how many degrees they be asunder: whereby is knowne at what time they haue any aspecte the one with the other. And also by the degrees it is knowne, what latitude and what declination any light or starre hath from the ecliptick or equinoctial: and also the degrees wil shewe vnto you, howe many myles that you do transporte your selfe vpon the earth to the South or North partes, for that euery degree doth aunswer vnto. 60. english miles, in the going South and North: which is knowne by the altitude of the North pole or the numbre of degrees betwene the equinoctiall and your zenith or verticall point, for from your zenith vnto the horizon, is. 90. degrees to the southwards, and 90. degrees vnto the Northwards, whiche is halfe the com-

passe

paſſe of the heauens for twice.90.is.180.and then the earthe doth hide the other halfe of the heauens: and twice.180.maketh.360.the whole contents of the compaſſe of euery greate circle in the heauens.

17. VVhat a Minute is.

OF Minuts there be two ſortes, minuts of tyme, and minuts of meaſure, and is no other thing but the leſſer parte of tyme or meaſure, whiche is the.60.parte of a degree, or the.60. parte of an houre: and all the diuiſions in theſe matters, is by.60.For as.60.Minuts is a degree or an houre,ſo.60.ſeconds is a Minute, and.60.thirds is a ſeconde, and.60.fourths is a third.&c.

18. Altitude is heigthe:the vſe thereof.

ALtitude is the heigthe of any thing taken, as the heigthe of the Sunne, or any Starre, or the brigth of the Pole, aboue the horizon: or the heigth of a ſteeple, or a tower, or ſuch other lyke.

19. Latitude is wideneſſe:the vſe thereof.

LAtitude is in the heauens: if the Mone, or any other Starre be vnto the South parts or the North partes of the ecliptick, that then it is ſayde,to be ſo manye degrees in latitude or wideneſſe, from ỹ line ecliptick to the South or North part: and alſo latitude is counted vpon the earthe in like maner,if that you be in any place betweene,from vnder the equinoctiall,either to the South or North part,betweene any of the.2.Poles, that you are ſo many degrees in latitude from the equinoctiall.&c.

20. Longitude is length:the vſe thereof.

LOngitude in the heauens is,if the Sunne or Mone or any other Starre,be in ſuche a ſigne, & ſo many degrees: that then it is ſaid:that they haue longitude,in ſuch a ſigne and ſo

many degrées. And alſo longitude vpon the earth, is counted from the Canarie Ilands vnto the Eaſtward, as this, if that any towne or cittie be vnto the Eaſtwards ſo many degrées from the Canarie Ilands, then it is ſayde, that the cittie or towne is ſo many degrees in Longitude, whereby is knowne the time of the chaunges of the Mone, or any other aſpecte, or anye Eclipſe of the Sunne or Mone, at the cittie or towne.

21. Declination is leaning: the vſe thereof.

DEclination is counted in the heauens, if that the Sunne or any other Starre be vnto the North part, or South part of the equinoctiall, then it is ſaide, that the Sunne or Starre hath ſo many degrées of declination to the South, or to the North parts, as it happeneth. &c.

22. Circumference is the compaſſe of a circle by the outer edge.

DIameter is the breath of a circle, paſſing right ouer the center or midle thereof, from outſide vnto outſide.

23. Center is the middle pricke in any circle, equally diſtant from the edge of the circle in euery place.

APareiell line or circle is, if two lines or more (how many ſoeuer there be) be equally diſtaunt in euery place alike, being right lines.

24. Auge what it is.

AUge is a point in the heauens, whē the Sunne or Mone is excentrick, going nearer vnto the heauens, and further from the earth than hir common order is: and the oppoſition thereof is, when that the Sunne and Mone do come nearer vnto the earth than they do at any other time.

The vſe thereof.

The

The vſe thereof is, to knowe when that they be in theyr ſwift motion, or in their ſlow motiõ: in the point of Auge, they be in their ſlow motiõ, in the oppoſition thereof in their ſwift motion.

25. VVhat the head or tayle of the Dragon is.

The head of the Dragon, is the place where that the Mone dothe come ouer the line Ecliptick, from the South part, vnto the North part: and the tayle of the Dragon is, where the Mone palleth ouer the line ecliptick, from the Northe part, vnto the South part.

The vſe of the head and tayle of the Dragon.

The vſe of the head and tayle of the Dragon, is to know, when that there is any eclipſe of the Sunne or Mone: and of what quantitie or greatneſſe the eclipſe is.

26. VVhat Nauigation is.

Nauigation is this, how to direct his courſe in the Sea to any place aſſigned, and to conſider in that direction what things may ſtande with him, & what things may ſtand againſt him, hauing conſideration how to preſerue the ſhip in all ſtormes and chaunges of weather that may happen by the way, to bring the ſhip ſafe vnto the port aſſigned, and in the ſhorteſt time.

The vſe of Nauigation.

The vſe thereof is this, fyrſte to knowe howe that the place dothe beare from him, by what winde or poynte of the compaſſe, and alſo how farre that the place is from hym, and alſo to conſider the ſtreame, or tide gates, Currents, which way that they do ſet or driue the ſhip, and alſo to conſider what daungers is by the waye, as rockes and ſandes, and ſuche other lyke impedimentes, and alſo if that the wynde chaunge or ſhifte by the waye, to

conſider which way to ſtand, and direct his courſe vnto the moſt aduantage to attayne vnto the porte in ſhorteſt time: and alſo if anye ſtormes doe happen by the way, to conſider how for to preſerue the ſhippe and the goodes, and to bring hir ſafe vnto the porte aſſygned. And alſo it is moſte principally to be conſidered and forſeene, that if they haue hadde by occaſion of a contrarye tempeſt, for to goe very muche out of the courſe or way, to knowe then howe that the place dothe then beare, that is to ſay, by what poynte of the compaſſe the place dothe ſtande from you: and alſo how farre it may be from you. Whyche way to bee knowne is this: firſte to conſider by what poynte that the ſhippe hath made hir way by, and how faſt and ſwiftly that the ſhippe hathe gone, and to conſider how often that the ſhippe hathe altered hir courſe, and how muche that ſhe hathe gone at euery tyme, and then to conſider all thys in youre platte or carde, and ſo you may gyue anneere geſſe, by what poynte or wynde it beareth from you, and alſo howe farre it is thither. And alſo you may haue a greate helpe by the Sunne or Starres, to take the heigthe of the Pole aboue the horizon, and alſo in ſome place you may geſſe by the ſounding, bothe by the depth, and alſo by the grounde. And alſo it is verye meete and neceſſarye to knowe any place, when that he dothe ſee it.

## 27. Of inſtrumentes to vſe at the Sea for to take the heigthe of the Sunne or any Starres.

ALl inſtrumentes to take the heighte of the Sunne or anye Starre, the originall of the making thereof, it is eyther a circle or the parte of a circle, whoſe diuiſion is the. 360. parte of a circle, what forme ſoeuer that it hathe, as your croſſe ſtaffe, it is marked according vnto the proportion of a circle, and euery one of the degrees,

degrées, is the equall parte of a circle, the three hundred and sixtie part.&c.

## The vse of the Instruments.

The vse of the Instrumentes, as Astrolobes or common Rings, or the crosse staffe, is to take the heigth of the sūne or other starrs, whose vses doe folowe here after in the boke.

## 28. VVhat maner of persons be meetest to take charge of Shippes in Nauigation.

As touching those persons that are māte to take charge, that is to say, to be as maister of ships in Nauigation, he ought to be sober and wise, and not to be light or rash braded, nor to be to fumish or hasty, but such a one as can wel gouern himselfe, for else it is not possible for him to gouerne his cōpany well: he ought not to be to simple, but he must be suche a one as must keepe his companie in awe of him (by discretion,) doing his companie no iniurie or wrong, but to let thē haue that whiche men ought to haue, and then to see vnto them that they doe their labour as men ought to doe in all points. And the principall point in gouernment is, to cause himself both to be feared & loued, & that groweth principally by this meanes, to cherishe men in well doing, and those men that be honestly addicted, to let them haue reasonable preheminence, so that it be not hurtfull vnto the Marchaunt nor to himselfe, and to punishe those that be malefactors and disturbers of their company, and for smal faults, to giue them gentle admonition to amende them: and principally these two pointes are to be forseene by the maisters, (that is) to serue God himselfe, and to see that all the whole compame do so in like maner, at suche conuenient time as it is meete to be done: the second point is, that the maister vse no play at the dise or cardes, neither (as near as he cā) to suffer any, for ỹ sufferance therof may do very much hurt in diuers respects: And further more, the maister ought to be suche a one, as

dothe knowe the Mones course, whereby he doth knowe at what time it is a full Sea, or a lowe water, knowing in what quarter or part of the skye, that the Mone doth make a full Sea at that place, and also the master ought to bee acquainted, or knowe that place well, that he doth take charge to goe vnto (except that he haue a Pilot) and also he that taketh charge vpon him, ought to be expert, how the tydegates or currentes doe set from place vnto place: and also not to bee ignorant of such daungers as lyeth by the way, as rocks, sandes, or bankes, and also most principally he ought to bee suche a one, as can very well directe his courses vnto any place assigned, and to haue capacitie howe for to handle or shift himselfe in foule weather or stormes. And also it behoueth him to be a good coaster, that is to say, to knowe euery place by the sight thereof. And also he that taketh charge for long voyages, ought to haue knowledge in plats or cardes, and also in such instruments as be meet to take the heigth of the Sunne or any Starre, and to haue capacitie to correcte those instrumentes, and also he ought to be suche a one, that can calculate the Sunnes declination, or else to haue some true regiment, and also he ought to knowe howe to handle the Sunnes declination, when that he hath taken the heigth of the Sunne.

# ¶Nowe beginneth the Regiment for the Sea, the firſt Chapter or rule of Nauigation, and ſheweth what the. 32. pointes of the Compaſſe is, and to what vſes they do ſerue.

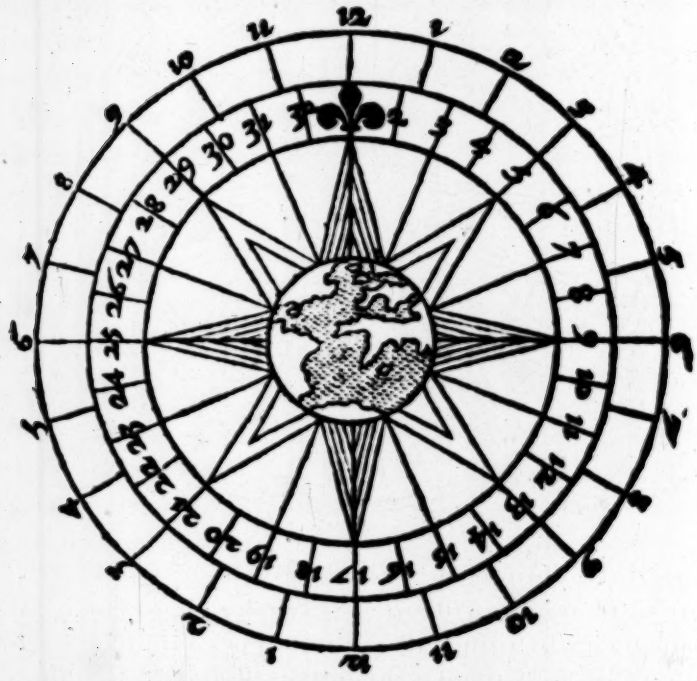
THe firſt & moſt principall thing for any ſeafaring mã or traueller, is to know toward what part of the Earth he meaneth to go, & then being vpõ the ſea, ther he ſeeth no path nor mark to trauell by, but only the vſe of the Needle or compaſſe. And to ſhewe the cauſe how they in olde time did finde them or called them, is ſufficiently declared by other, but this is to be noted: There be eight capitall or head windes or poyntes, and foure of them haue their names properly of themſelues, and the other foure of them, are deriued, or take their names of the other foure, as this, South commeth directly from the Meridian, and North is directly againſte it, and Eaſt commeth from the Equinoctiall poynte, towardes the partes of the Sunne ryſing, and Weaſt is right againſt it, Northeaſt is in the midway betweene the Eaſte and the North, and Southeaſt in the midway betweene the Eaſt and the South, and Southweſt betweene the Weaſt and the South, and Northweaſt in the middle betweene the North and the Weaſt. And then there be eight inferior points, or winds, halfe way betweene euery one of thoſe. 8. capitall or head poynts or wynds, and that is Northe Northeaſt, Eaſt Northeaſt, Eaſt Southeaſt, and Southe Southeaſte, and South Southweaſt, and Weaſte Southweaſte, and Weaſte Northweaſte, and Northe Northweaſte: and nowe betweene euerie one of theſe inferioure poyntes, and euerye one of the heade wyndes there

8. Capitall or head pointes.

8. Inferior pointes or winds.

there is a by poynt or winde, and he is called a by point, for that he is not named but by the name of one of the heade points nert adioyning. There be. 16. of them in nũber, so that there be. 8. capitall or head points, and. 8. inferior points, and 16. by pointes or windes, so that in all there be. 32. of them. The vse of these points is, to direct the shippe to what quarter of the world you do assigne, to keepe that course to find the place so assygned, for that the propertie of the Needle or Fyre, is alwayes to stand due South and North.

16. by pointes of windes.



As touching Nauigation, for the instructions of the meanest I haue set this figure or compasse, where first is to be noted the. 32. winds and poynts of the compasse aboue made. The flourdeluce is the first pointe, and these be the names, beginning at the North, and so with the course of the Sunne to say

to say North.1. North and by East.2. North noreast.3. North east and by North.4. Northeast.5. Northeast and by East.6. East Northeast.7. East and by North.8. East.9. East and by South.10, Easte Southeast.11. Southeast and by East.12. Southeast.13. Southeast and by South.14. South southeast. 15. South and by East.16. South.17. South and by Weast.18 South Southwest.19. Southweast and by South.20. South weast.21. Southwest and by Weast.22. Weast Southwest. 23. Weast and by South.24. West.25. Weast and by North. 26. Weast Northweast.27. Northweast and by Weast.28. Northweast.29. Northeast and by North.30. North Northweast.31. North and by Weast.32. This is the whole contents of the.32. windes, and there is in the compasse the contents of the great circle, or Equinoctiall circle being.360 degrees in compasse, so that euery point containeth.11. degrees, and ¼ and.4. points containe.45. degrees.8. points containeth one quarter of the compasse or Equinoctiall circle, being.90. degrees.16. points containeth halfe the circumference.180. degrees, and euery degree containeth.60. secondes and so forth. Furthermore, the.32. pointes containe.24. houres, that is to say, one point containeth.3. quarters of an hour.45. minutes: and.2. pointes one houre and a halfe.4. pointes.3. houres: 8. poyntes.6. houres.12. poyntes.9. houres.16. poyntes.12. houres, and so to the rest of the poyntes. And euery houre contayneth.60. minutes: and euery halfe houre.30. minutes, and euery quarter of an houre.15. minutes: and after that rate.45. minutes maketh three quarters of an houre.

The names of the.32. pointes of the cōpasse.

The contents of the Equinoctiall circle 360. degres one point of the cōpasse contayneth 11. degrees and a quarter.

The.32. pointes brought into.24. houres.

C. The

# ¶ The ſecond Chapter or rule

treateth of the Golden number or Prime, ſhewing the Epacte, and by the Epacte to knowe the Age of the Moone.

IT is neceſſary and conuenient for the Seafaring men, to knowe the Prime or Golden number: for by the Golden number is knowne the Epacte, and the Epacte ſheweth the age of the Moone or chaunge day, within. 12. houres vnder or ouer: and by the age of the Moone, you may know at what a clocke it doth flowe in any place that you doe knowe what Moone doth make a full Sea: therefore it is mete to know the Epacte, and that is knowne by the Pryme, or Golden number. The cauſe why it was called the Golden number, was bycauſe it was ſent out of Egypte in letters of golde, to the Romaines or Citie of Rome. The cauſe why that it is called the Pryme, was for that it was the firſt order that the Moones courſe was known by, and it is thus knowne. Adde one to the yeare of our Lord that you would knowe the Golden number or Pryme of, then deuide the number by. 19. the remainer is the Pryme: and multiply that by. 11. and loke what the number commeth vnto, deuide that by. 30. the remayner is the Epact. Then when you haue once the Epact, adde. 11. to your Epact for euery yere more, and loke what that commeth to, that is your Epact: and if it do paſſe. 30. put that away, and kæpe the remainer for your Epact. And thus this rule will ſerue for euer, ſauing when the Pryme beginneth at one, for then the Epacte is. 11. and then doe (as aforeſayde) as you may percegue by this table here following.

The cauſe why that it was called the Pryme or Golden number.

To knowe howe many the Epact is.

The

# ¶ The Table of Pryme and Epacte for. 19. yeares, and vvhen thoſe. 19. yeares be ended, then beginne againe, and ſo it will ſerue for euer. &c.

| The yere of the Lorde. | Pryme. | Epact. | The yere of the Lorde. | Pryme. | Epact. |
|---|---|---|---|---|---|
| 1574 | 17 | 7 | 1584 | 8 | 28 |
| 1575 | 18 | 18 | 1585 | 9 | 9 |
| 1576 | 19 | 29 | 1586 | 10 | 20 |
| 1577 | 1 | 11 | 1587 | 11 | 1 |
| 1578 | 2 | 22 | 1588 | 12 | 12 |
| 1579 | 3 | 3 | 1589 | 13 | 23 |
| 1580 | 4 | 14 | 1590 | 14 | 4 |
| 1581 | 5 | 25 | 1591 | 15 | 15 |
| 1582 | 6 | 6 | 1592 | 16 | 26 |
| 1583 | 7 | 17 | | | |

THe Prime or Golden number, is the time of. 19. yeares, in the which time the Mone maketh all hir chaunges or coniunctions with the Sunne, and when all theſe. 19. yeares be expired, then ſhe beginneth againe: as for example. This yeare being the yeare of our Lord. 1574. ſhe chaunged the. 22. day of March, and euery yere doth alter. 11. days of hir change till the yere. 1593. and then ſhe chaungeth the ſayd. 22. daye of March againe, as I ſhewed you before. The Epacte is the putting to. 11. for euery yeare. Nowe furthermore to knowe the age of the Mone, do thus: take the number of the Epact for your yere (beginning at March alwayes) and recken how many monthes it is from March, (counting March for one)

The pryme is the time of. 19. yeres

To knowe the age of the Moone by the number of the Epact.

then recken howe many dayes of the moneth it is in whiche you would knowe the age of the Mone: Then put all your numbers togither, (that is to say, your Epacte, your moneth from March, and euery day of the moneth,) then loke howe many it amounteth vnto, that is the age of the Mone, but if it passe. 30. throwe all the. 30. away, and keepe that that will not be. 30. for when the age of the Mone is iust. 30. then is it the chaunge daye: and if it be the fiftenth daye of the age of the Mone, then the Mone is at the full. When the age is betweene seuen dayes and eight, then is the first quarter. And if it be. xxij. dayes olde, then the Mone is at the laste quarter: as for example, this yeare. 1574. I loke and finde the Epacte. 7. for the yeare, nowe I woulde knowe the age of the Mone, the. 13. daye of June. Nowe I recken how many monthes it is from March, reckning March for one, and I finde it is foure monethes, then I take and adde all these togyther, that is to say, seuen for the Epacte, and foure for the monethes (that is to say, March, Aprill, May, June) and then. 13. for the dayes of the moneth, and all commeth to. 24. So that you may conclude that the Mone is. 24. dayes olde, and was at the laste quarter two dayes before.

## ¶ The thirde Chapter or rule treateth, howe to knowe by the age of the Moone what houre it dothe flowe, or is full Sea at any place, where you doe knowe what Moone maketh a full Sea.

NOwe by the age of the Mone you may knowe at what houre it floweth in any place, where you do know what Mone maketh a full Sea, whiche rule commonly the Sea men cal the shifting their Sunne and Mone: and many wayes there be to doe it, for thus they may doe it: Let them deuide

deuide one houre into.5.parts, and the take.4.of those parts, and put the fifth part away, that serueth for the alteration of 24.houres, & the foure fift parts of an houre, are.48.minuts, and the.5.part of an houre is.12.minuts. A flood and an ebbe, doth alter.24.minuts forwards: as this for example: it flo-weth at.12.of the clocke at the Lands end vpon the chaunge day, the Moone being in the South: at all times a full Sea. The Moone being one day old, it floweth at.12.of the clocke. 48.minuts. 2.dayes olde it floweth at one of the clock.36.minuts.3.days old it floweth at.2.of the clock.24. minuts: four dayes old it floweth at.3.of the clocke.12.minuts: fiue dayes old, it floweth at.4.of the clocke iust: Sixe dayes old, it flo-weth at.4.of the clocke.48.minuts: Seuen dayes old at.5.of the clocke.36.minuts: Eight dayes old at.6.of the clocke.24. minuts: Nine dayes old, at.7.of the clocke. 12. minuts: Ten dayes old, it floweth at.8.of the clocke iust: Eleuen dayes old at.8.of the clocke.48.minuts: 12.dayes.9 of the clocke.36.mi-nuts: 13.dayes old.10.of the clocke.24.minuts: 14.days old, it floweth at.11.of the clocke.12.minuts: 15.dayes old, it floweth at.12.of the clock iust, then being the full Moone: and so begin againe as you did before at one day old, and so forth. For the course of the tides is nothing else but to adde for euery day of the age of the Moone one houre, pulling backe the fifth part of an houre (being.12.minuts) and by this accompt you may at all times knowe at what a clocke it doth flowe, by putting to euery floudde and ebbe.24.minuts, and to.2.flouds and.2. ebbes putting to.48.minuts. Now furthermore the Sea-men vse to make their accompt by this meanes (but it is all one) they do allow for euery day of the age of the Moone, one point and.3 minuts: for a point of the compasse conteineth. 45.minuts that is.3.quarters of an houre. Then they put.3. minuts to.45.minuts, which maketh.48.minuts, the sayd.3. minuts be the.15.part of a point, and from the chaunge to the full is.15.days, so that (the halfe compasse being.16.pointes) they breake the odde point into.15.partes, and that commeth

To knowe the alteration of the tides in.24 houres.

An ensample for the full Sea vppon the Lands end, for euery day of the age of the Moone.

To shift the Sunne and the Moone by the points of the compasse.

to.3.minuts,so that the alteration of the tides,for euery.24. houres,be.48.minuts, or ẏ.4.fifth parts of an houre. Wherfore there shall follow a table of tides about certain places of this realme: for euery Mone contrineth. 29. dayes. 12. hours.44.minutes from chaunge to chaunge:the whole contents of the houres of the Mone, be.708.houres, and.44.minuts. And there is in euery yeare.12.changes of the Mone: and the yeare conteineth.365.days.5.houres.55.minuts.13.seconds. Yet some do affirme to be odde.6.houres,but there lacketh. 4. minuts. 47. seconds in the tropicall yeare. Likewise in the yeare be.12.moneths agreable to the.12.Mones: the 12.Mones conteine but.354.dayes,so that there be.11.dais more in the yeare,than there be in the.12.mones. The yeare also is deuided into.12.moneths,which moneths haue taken their names at the will and pleasure of menne: as first January, was so called, of Ianus bycause of.2.heades, for the month of January beholdeth the end of the yeare past and the beginning of the yeare to come. February toke his name of certaine romaine sacrifices called Februa. March is so called of Mars, for Romulus so named it after his father. Aprill cõmes of Aperio,bycause that then the earth is opened. Maye of Maia,the mother of Mercury, June so called by preparing to the warre. July of Iulius Cesar, and Augustus of Augustus Cesar for in that month he entred the cõsulship:then the rest of the months toke their names of their number frõ March. Now these.12.months which maketh the yeare,the Sunne dothe passe or go through the Zodiack called the.12.signes, which is the occasion of the yeare,for this is to be noted, that the sunne as I saide before, doth go by his naturall mouing in.365.days.5.houres.55.minuts.13.seconds,through the Zodiack,conteining. 360. degrees, his course being againste the 24.houres, going from the Weast into the East, against the course of *primum mobile*, or first mouer, being moued by the mighty prouidence of God, which maketh the.24.houres:and so dothe all the seuen lights, or planets,(except)that it be in their

The content of the number of dayes and houres in one moone: ẏ houres in euery mone be.708.44 minuts.

The contente of a year is.365 dayes.5. houres.55. minuts.

How the moneths tooke their names.

The Zodiack contyneth.360. degrees.

The mouing of.24. houres.

their retrogratiõ: but the Sunne and the Moone, be neuer retrograt, as the other. 5. planets or lights be. And this is to be noted, that the Moone goeth faster thã the Sunne, for she goeth through the whole Zodiack in. 27. dayes and .8. houres. Now in that same time the sunne is remoued by his natural mouing from that place of the Zodiack neare. 27 degrees: and then bycause that the Moone hath not found the Sunne ther, it is. 2. dayes foure houres foure and forty minuts more before that the Moone ouertaketh the Sunne againe, so by that meanes it is. 29. dayes twelue houres and. 44. minuts betweene the chaunge of the Moone and the nert chaunge, one Moone with an other throwe the yeare, although that the Moone may chaunge sometime in lesse time and sometime in longer time, that is by the meanes of the. 3. motions of the Moone, that is to say hir swift motion and hir midle motion and hir slow motion, whiche groweth by the meanes of the mones Auge or oppositiõ thereof. The Moone being in Auge, goeth but little more than. 12 degrees in. 24. hours. And in the õpositiõ of Auge neere. 15. degrees in. 24. hours, and in hir midle or equall motion. 13. degrees. 12. minuts. So this is the occasion why sometime the Moone may chaunge soner or be detracted longer than the time of. 29. dayes. 12. houres and 44. minutes. This point of Auge is mouable, and doth passe throughe the Zodiack in the time of. 19. yeare: and it causeth sometime the full of the Moone to happen soner and later. In like manner also the quarters of the Moone, with al the other aspects that the Moone hath with the Sunne, or any other of the planets, according to the mones motion. In like maner (by the meanes of the. 3. motions of the Moone) sometime the Moone goeth more thã one point and. 3 minuts in. 24. hours, and sometimes lesse than one point and. 3. minuts, as this for erample: the Moone being in hir slow motiõ, goeth but little more than. 12. degrees in. 24. hours, and then the Sunne in that time doth go one degree: and then is there but. 11. degrees betweene the Sunne and the Moone (that is but. 44. minuts)

The tyme that the Moone goeth throwe the. 12. signes.

The. 3. motions of the Moone.

Of Auge.

The cause why the Moone chaungeth rather or later.

The mone goeth in. 24. hours sometimes more degrees and sometime fewer degrees.

So

The mone is not one point aſunder from the Sunne in.24. houres.

So that the Mone is not one point in.24. houres from the ſunne. But being in hir ſwift motion ſhe goeth nere.15. degrees in.24. houres, and the Sunne goeth one degree in that time: ſo that there is.14. degrees in.24. houres, betweene the Mone and the Sunne, (that is.56. minuts) which is a pointe and.11. minuts.23. But notwithſtãding I would not wiſh the common Marriners to trouble themſelues with theſe matters, but to followe their accuſtomed order, to allowe for euery day of the age of the Mone, one pointe, and.3. minuts, &c.

The mone is in.24. houres a point and.11. minuts aſunder frõ the Sunne

And thus muche haue I ſaid of the Mones motion: for that ſome Sea men will take vpon them to correct ỹ Almanacks as touching the chaunge and quarters of the Mone: holding this opinion, that euery Mone ought to be equal in the number of the dayes and houres: and the full mones to be iuſt the halfe contents. And the quarters in like manner, the iuſt.4. parte in dayes and houres, ſo that ſome of them will take vpon them to tel (by the rule of the epact,) the true houre of the chaunge, quarters and full of the Mone. Wherein they are notably deceiued. Againe, ſometime in the yeare you ſhall ſee the Mone rarer thã at ſome other time, as this for example: from Januarie to Iune you ſhall ſee the Mone within.24. houres after the chaunge: becauſe ſhe hath North declination of the Sunne, and maketh a bigger arche thã the Sunne. From July to December you ſhall not ſee the Mone.3. dayes after the chaunge: becauſe hir declination is to the South part of the Sunne: but you may ſee hir in.24. houres, before hir chaunge. Now, the Sea men do imagin a prime day, which is the halfe quarter of the Mone, that is: when the Mone is three dayes and.8 houres old, (the Mone being then.4. points to the Eaſtward of the Sunne, whiche is.3. houres) the ſame rule may they in like caſe obſerue when the Mone is paſte the full. 3. days and.8. houres, and alſo in the middes of the quarters.

Erroꝛ of Marriners

Now

## Here followeth a table of Tides.

FIrſt, the Wone South or North: on Landes ende full Sea.

The Wone South and by East: at the Gaze ende full Sea.

The Wone South southwest: betweene holy Iland and Tinemouth full Sea.

It floweth betweene Tinemouth and Flamborough head, Southwest and Northeast Wone.

It floweth betweene Flamborough head and Bridlington in the bay: a South west and by West Wone.

The Wone in the West Southwest: betweene Bridlington and Laurenas full Sea.

It floweth betweene Laurenas and Cromer all along the well: an East and West Wone.

It floweth betweene Cromer and Yarmouth rode, to Layſtow North rode: a Southeast Wone.

It floweth betweene Laiſtowe rode and Orfordenas: a Southeast and by South Wone.

It floweth betweene Orford, and Orewel wands: a South Southeast Wone.

It floweth betweene the Naze & the Ware head of Colne: a South and by East Wone.

It floweth at the Spittes and at the Sheue and al alongſt the Swinne: a South Wone.

At the West end of the Noze: a Southe and by West Wone, full Sea.

It floweth at Grauesend: a South Southwest Wone.

It floweth at London Bridge: a Southwest Wone.

It floweth at the North foreland: a South Southeast Wone, & ſo alongſt the coaſt till you come to Bechy. And in the ofton from the North foreland to the South foreland: it runneth halfe tide. And frō the South foreland to the Naze:

the tide runneth halfe tyde halfe quarter. And from the Nas to the Fairely: it runneth halfe tide, and from Fairely to Beche: it runneth quarter tide vnder other.

It floweth to the Weastward of Beche, a kenning: a Southeast and by South Wone.

It floweth at Portesmouth: a Southe and by East Wone.

It floweth at S. Elens: a South Southeast Wone.

It floweth on the Sea side of the Iland: a Southeast and by South Wone: and so on the Lande, and at the Nædles, and runneth quarter tide in the ostonne.

It floweth at Wole in the hauen: a Southeast Wone.

It floweth at Waymouth: an East and West Wone.

It floweth at Portland a South: east Wone.

It floweth from the Weaste parte of Portlande, till you come vnto Plymmouth: an East and Weast Wone.

It floweth on the shoare from Plymmouth to the Lizard: a West and by Southe Wone. And in the ostonne a Southeast Wone.

It floweth at Pountes baye: an East and Weaste Wone.

It floweth at Selly: a West and by South Wone.

It floweth at the Landes ende of Scilfe: a West Southwest Wone.

It floweth all alongst the coast vp to Bristowe, and the coast of Ireland, from Waterford to Kinsale: a West and by South Wone.

Furthermore it floweth (for the most part) from the poll head of Burdeaux all alongst the coast of Biskey, Galiza, Portingale, till you come to the straightes of Paliga, a Southwest and Northeast Wone.

It floweth at Flushing: a Southweast and by Southe Wone.

It

It floweth at Antwerp: an East and west Powne.

It floweth all alongest the coast of Flaunders, from the Wyldings to Calys: a Southe and by East Powne: and so runneth halfe a tide vnder the other.

Nowe here is one speciall thyng to bee noted, and that is thys: it floweth one poynte of the compasse more in the Spring streames, than it dothe in any of the quarters of the Powne (so that it be a riuer where-there is any indrafte, hauing distaunce from the Sea) when there is neyther rage of wyndes nor anye cause eyther to hinder or further the sayde effect. As for example thus: it floweth at Graueſend at the chaunge of the Powne or full: a Southe Southwest Powne. But in any of the quarters of the Powne it skante floweth a Southe and by West Powne: and this is generally for euer.

It will flow a point of the compasse more in ỹ spring tides than in the neap tides in a River that hath any distance vnto the Sea.

# The fourth Chapter treateth of the Sunne & moones course in the Zodiack: and how you shall know what houres the Moone shall rise and set at: and at what poynte of the compasse: vvyth other necessarye thynges.

FUrthermore the Sunne (by hys naturall mouing thorough the twelue Signes in the Zo-

diack, in the yeare) dothe cause the heigth and lowenesse of his declination : whiche is necessarie for the Seafaring men to knowe, in whiche declination they do take from equinoctiall to equinoctiall : and this is to be noted, that as the Sunne hathe declination, so in like manner hathe the Mone, for by hir declination, and the Sunne, is knowen the tyme of hir shyning or abiding aboue our horizon. The Sunne or Mone in the firste minute of Aries do rise East, and set West, and shyne. 12. houres. In the first minute of Taurus they rise nere the Este Northeast, and set nere the West Northwest, and shyne. 14. houres. In the signe of Gemini : they rise nere the Northeast and by East, and they set nere the Northwest and by West, and shyne. 16. houres. In the signe of Cancer the firste minute : they make their greatest declination to the Northwards, and they rise ner the Northeast, and set nere the Northweast and shyne nere. 17. houres. In the fyrste minute of Leo (discending towardes the equinoctiall,) as they dyd in Gemini. And in the signe of Virgo, as they dyd in Taurus. And in the firste minute of Libra, equinoctiall : beginning South declination, as in Aries. And in the fyrste minute of Scorpio : they rise nere the Este Southeast, and sette nere the Weast Southweast, and shyne. 10. houres. In the fyrste minute of Sagittarius : they rise nere the Southeast and by East, and set nere the Southwest, and by weast, and shyne. 8. houres. In the fyrste minute of Capricornus, they haue their greatest declinatiõ to the South, and begin to returne to the equinoctiall, rising nere the Southeast and setting nere the Southwest, and shyne more than. 7. houres. In the firste minute of Aquarius : as in Sagittarius. In the firste minute of Pisces : as in Scorpio. Nowe by this rule you may knowe the rising and setting of the Mone for euer : as thus : I haue shewed you before in the shifting of the Sunne and Mone, that for euery

To know how long the Mone shineth.

euery day of the age of the Mone, the Mone goeth Eaſtward one point & .3. minuts: in .2. dayes .2. points and .6. minuts. &c. Nowe when you liſt to knowe the very houre and time of hir riſing: Loke howe many dayes the Mone is olde, then put ſo many points, and ſo many .3. minutes, and loke what it amounteth vnto. Which for your better vnderſtanding, I will ſhew by example: and firſt of the Mones being South, by euery day of the age of the Mone. The Mone being one daye olde: is South at. 12. of the clocke. 48. minutes. The Mone being .2. dayes olde, is South at one of the clocke. 36. minuts in the after none. Thre dayes old: South at .2. of the clock .24. minuts. 4. dayes olde, at .3. of the clock .12. minutes. 5. dayes olde: at .4. of the clock iuſt. 6. dayes olde at .4. of the clock 48. minuts. 7. dayes olde at .5 of the clock .36. minutes. When the Mone is iuſt a quarter old, ſhe is South at .6. of the clock at night. at .8. dayes olde: the Mone is South at .6. of the clocke .48. minutes. at .9. dayes olde at .7. of the clock .12. minutes. at .10 dayes olde: at .8. of the clocke iuſt. At .11. dayes olde at .8. of the clock .48. minutes. at .12. dayes olde at .9. of the clocke .36. minutes, at .13. dayes olde at .10. of the clock .24. minutes. at .14. dayes olde at .11. of the clocke .12. minutes. at .15. dayes olde (being the full Mone) ſhe is then South at midnight. One daye after the full Mone: ſhe is South at. 12. of the clocke. 48. minutes at midnight. Two dayes after the full: at one of the clocke .36. minutes. Thre dayes after, at .2 of the clocke .24. minutes. Foure dayes after, at .3. of the clock .12. minutes. Fiue dayes after at. 4. of the clocke, iuſt in the morning. Sixe dayes after, at .4. of the clock .48. minutes. 7. dayes after, at .5. of the clocke .36. minutes. When the Mone is thre quarters olde, ſhe is South at. 6. of the clocke in the morning. At. 8. dayes after the full (being the firſte daye after the quarter) at .6. of the clocke .24. minuts. 9. dayes after: at 7. of the clocke .12 minutes. 10. dayes after, at .8. of the clocke iuſt. 11. dayes after, at .8. of the clocke .48. minutes. 12. dayes after, South at .9. of the clocke, 36. minutes. 13. dayes after,

To knowe what houre: o: pount the Moone ryſeth or ſetteth.

To knowe what houre the Moone: is South for euery day of the age of the Moone..

South at. 10. of the clocke in the forenoone. 24. minutes. 14. dayes after, at. 11. of the clocke. 12. minutes. at. 15. dayes after the Moone dothe chaunge (being then with the Sunne) for the chaunge of the Moone is, when the Moone and the Sunne be bothe vnder one like degree and minute of any signe of the Zodiack. The full Moone is, when the Sunne and the Moone be opposite (the one being directly against the other, and iust. 6. signes asunder) as you maye perceiue at the full Moone: for then when the Moone ryseth, the Sunne setteth: and when the sunne ryseth, the Moone setteth. The quarters be, when the Sunne and Moone be iust. 3. signes asunder (that is, iust. 90. degrees.) Nowe when you list to knowe the very time of the Moones rysing or setting, loke in your Kalender what signe and degree the Moone is in: then according to the rule of the shining, deuide that into. 2. equall partes, then from the South, so shall you see at what houre the Moone ryseth, as for example this. In March alwayes the Sunne is in Aries, then the Moone being in hir first quarter, then she is 6. hours to the Eastward of the Sunne, then the Moone must nedes be in Cancer. Then shineth the Moone in our Horizon 17. houres, then the Moone is South at. 6. of the clock, then she shineth. 8. houres and a halfe after. 6. of the clock. So that she setteth at. 2. of the clock and halfe an houre past, then she ryseth in the day. 8. houres and a half before. 6. of the clock, that is at. 9. of the clocke and halfe an houre past. Now at the last quarter in March, then the Moone muste nedes be in Capricornus, then shineth the Moone but. 7. houres, then the moone is South at. 6. of the clock in the morning, then the Moone riseth. 3. houres and a halfe before, that is, at. 2. of the clocke and halfe an houre passe in the morning, then she setteth by day at. 9. of the clocke and halfe an houre passe, and this rule will serue for euer without any great error. But yet there is a further matter for the exacte doing, which is the Latitude of the Moone from the heade or tayle of the Dragon, but that is but a trifle in respecte of muche error, and therefore I will not

Of the chaunge.

Of the full Moone.

Quarter of the Moon.

Ensample of the moones rysing & setting.

The Moone hath latitude.

not trouble you with that: yet there is one thing whiche I would Seafaring men should consider, although a great nũ be expert in that, yet it is meete to be spoken of, as this. The Sunne being in Cancer or Mone in like maner, or in Gemini, or any time when the Sunne or Mone hath North declination, they will set their compasse before them, and when they see the Sunne give an East shadowe, they will saye that it is .6. of the clock, which and if the Sunne be in Cancer, it is not muche passe five of the clocke, and the more to the South wardes the more they doe erre. And in like case, the Mone being in Cancer when they doe see the Mone give an East shadowe by their compasse, they will say the Mone is Weast, but they do not consider that the Sunne and the Mone being in Cancer, commeth so neare our Zenithe or Verticall poynte right over our heade, whiche is the verie heigth of their declination comming so neare them, therfore they must judge the East or Weast from the Pole or North starre if they will judge truely. Wherefore I do much commende the Equinoctiall Dyals for the exacte truth, for they can not know the truth by their compasse, so that the Sunne, or Mone or any other Starre have any great declination being in Cancer: and you must consider this in like manner. The Sunne having North declination, the further you doe goe to the North wardes, the longer is youre daye, and the shorter is your night, and towardes the Southward, the shorter dayes and longer nightes. Nowe contrarywise, the Sunne having South declination, the more to the Northwardes, the shorter dayes and the longer nightes, the further to the Southwards, the longer days and shorter nights, and under the Equinoctiall, the nightes and dayes all one what declination soeuer the Sunne hath: but this rule that I have given you is for London, or any other place that hath that Latitude or elevation of the Pole Artick at .51. M. 32. degrees.

You cannot know what a clock it is by the compasse, the Sun being in the north signes.

Error of the shadow of the Moone

The Equinoctiall dyals be very good.

As touching the length and shortnesse of the day and night.

The

# The regiment for the Sea.

## ¶ The fifth Chapter or rule, is of a table of declination commonly called of Seafaring men, a Regiment of the Sunne, exactly calculated for 4. yeres, and will serue for 24. yeres, for euery day of the moneth.

NOw shall followe a table of declination or Regiment for 4. yeres, being calculated for England, and will serue all Europe without much error, or any other countrey or place that hath our Longitude, as the most part of Affrica, as Guinie and those partes to the South wards, as farre as the Antartick pole, seruing for euery day of the moneth, very necessarie for them that do vse to trauell either by sea or by land, and is one of the principall pointes in Nauigation for long voyages, and the cause why I haue written this Regiment for the Sea, or tables of declination, is for that I do knowe that euery person that goeth vnto the Sea as maister of a shippe, hath not capacitie to calculate the Sunnes declination by the place of the sunne, although they haue the tables of declination, as the Ephemerides, or Martin Curtyse, otherwise called the art of Nauigatiõ. Wherefore I haue written these notes, a Regiment or table of declination for. 4. yeres, and the first row towards your left hand, is the dayes of the moneth: the nert rowe is the degrees of declination that the Sunne hath at the instant time of noone: and the thirde rowe is the odde minutes of declination belonging to the degrees. Nowe there be two times in the yere that the Sunne hath no declinatiõ, as this. For the first yere after *Bissextilis*, (which was in the yere of our Lord. 1573. the. 11. day of March, at. 4 of the clock in the morning) the Sun was vpõ the Equinoctiall beginning North declination. And in like maner the 13. day of September at noone, the Sunne was vpon the Equinocti-

Euery person cannot calculate the Sunnes declination.

Two times in the yeare the Sunne hath no declination. 1573.

quinoctiall beginning South declination, and alſo the ſecond yere after *Biſſextilis*, which is the yere of our Lorde. 1574. the ſunne is vpon the Equinoctiall the. 11. day of Marche, betweene 10. and. 11. of the clocke before Noone, beginning North declination: and in like maner the. 13. day of September, at. 6. of the clocke in the after Noone, beginning South declination. Furthermore in the thirde yere after *Biſſextilis*, whiche is the yere of the Lorde. 1575. the ſunne is vpon the Equinoctiall the 11. day of Marche, betweene foure and fiue of the clocke in the after Noone, beginning North declination: ſo in like maner the. 13. day of September, at. 12. of the clocke at midnighte, beginning South declination. Laſtly, in the yere of our Lorde 1576. that is the yere *Biſſextilis* it ſelfe vpon the. 10. day of Marche the ſunne ſhall be vpon the Equinoctiall betweene 10. and. 11. of the clocke at night, beginning North declination: and in like maner the. 13. day of September at. 6 of the clocke in the morning, beginning South declination: Nowe theſe foure yeres being expired, you muſt after the yere of *Biſſextilis*, beginne agayne at the yere one, as here dothe followe for example.

| Yeare 1. | Yeare 2. | Yeare 3. | Yeare *Biſſextilis*. |
|---|---|---|---|
| 1573 | 1574 | 1575 | 1576 |
| 1577 | 1578 | 1579 | 1580 |
| 1581 | 1582 | 1583 | 1584 |
| 1585 | 1586 | 1587 | 1588 |
| 1589 | 1590 | 1591 | 1592 |

# 1573. The first yeare.

| Ianuarie. | | | | Februarie. | | | | Marche. | | |
|---|---|---|---|---|---|---|---|---|---|---|
| D. | G. | M. | | D. | G. | M. | | D. | G. | M. |
| 1 | 21 | 52 | South declination. | 1 | 14 | 7 | South declination. | 1 | 3 | 49 |
| 2 | 21 | 43 | | 2 | 13 | 47 | | 2 | 3 | 26 |
| 3 | 21 | 33 | | 3 | 13 | 26 | | 3 | 3 | 2 |
| 4 | 21 | 23 | | 4 | 13 | 6 | | 4 | 2 | 38 |
| 5 | 21 | 12 | | 5 | 12 | 46 | | 5 | 2 | 14 |
| 6 | 21 | 1 | | 6 | 12 | 26 | | 6 | 1 | 51 |
| 7 | 20 | 49 | | 7 | 12 | 5 | | 7 | 1 | 27 |
| 8 | 20 | 37 | | 8 | 11 | 44 | | 8 | 1 | 3 |
| 9 | 20 | 25 | | 9 | 11 | 22 | | 9 | 0 | 39 |
| 10 | 20 | 12 | | 10 | 11 | 1 | | 10 | 0 | 16 |
| 11 | 19 | 59 | | 11 | 10 | 39 | Equino- | 11 | 0 | 8 |
| 12 | 19 | 46 | | 12 | 10 | 18 | | 12 | 0 | 32 |
| 13 | 19 | 32 | | 13 | 9 | 56 | | 13 | 0 | 55 |
| 14 | 19 | 17 | | 14 | 9 | 33 | | 14 | 1 | 19 |
| 15 | 19 | 3 | | 15 | 9 | 11 | | 15 | 1 | 42 |
| 16 | 18 | 47 | | 16 | 8 | 49 | | 16 | 2 | 6 |
| 17 | 18 | 32 | | 17 | 8 | 26 | | 17 | 2 | 29 |
| 18 | 18 | 17 | | 18 | 8 | 4 | | 18 | 2 | 53 |
| 19 | 18 | 1 | | 19 | 7 | 41 | | 19 | 3 | 17 |
| 20 | 17 | 45 | | 20 | 7 | 19 | | 20 | 3 | 40 |
| 21 | 17 | 28 | | 21 | 6 | 56 | | 21 | 4 | 3 |
| 22 | 17 | 11 | | 22 | 6 | 33 | | 22 | 4 | 26 |
| 23 | 16 | 54 | | 23 | 6 | 10 | | 23 | 4 | 49 |
| 24 | 16 | 37 | | 24 | 5 | 46 | | 24 | 5 | 12 |
| 25 | 16 | 19 | | 25 | 5 | 23 | | 25 | 5 | 35 |
| 26 | 16 | 1 | | 26 | 5 | 0 | | 26 | 5 | 58 |
| 27 | 15 | 42 | | 27 | 4 | 36 | | 27 | 6 | 21 |
| 28 | 15 | 23 | | 28 | 4 | 13 | | 28 | 6 | 44 |
| 29 | 15 | 5 | | | | | | 29 | 7 | 6 |
| 30 | 14 | 46 | | | | | | 30 | 7 | 28 |
| 31 | 14 | 26 | | | | | | 31 | 7 | 50 |

Aprill.

| Aprill. | | | | May. | | | | Iune. | | |
|---|---|---|---|---|---|---|---|---|---|---|
| D. | G. | M. | | D. | G. | M. | | D. | G. | M. |
| 1 | 8 | 13 | North declination. | 1 | 17 | 49 | Solstic. North declination. | 1 | 23 | 8 |
| 2 | 8 | 35 | | 2 | 18 | 5 | | 2 | 23 | 12 |
| 3 | 8 | 57 | | 3 | 18 | 20 | | 3 | 23 | 15 |
| 4 | 9 | 19 | | 4 | 18 | 35 | | 4 | 23 | 18 |
| 5 | 9 | 41 | | 5 | 18 | 49 | | 5 | 23 | 22 |
| 6 | 10 | 2 | | 6 | 19 | 4 | | 6 | 23 | 24 |
| 7 | 10 | 23 | | 7 | 19 | 17 | | 7 | 23 | 26 |
| 8 | 10 | 44 | | 8 | 19 | 31 | | 8 | 23 | 27 |
| 9 | 11 | 6 | | 9 | 19 | 44 | | 9 | 23 | 27 |
| 10 | 11 | 25 | | 10 | 19 | 57 | | 10 | 23 | 28 |
| 11 | 11 | 45 | | 11 | 20 | 8 | | 11 | 23 | 28 |
| 12 | 12 | 9 | | 12 | 20 | 21 | | 12 | 23 | 28 |
| 13 | 12 | 26 | | 13 | 20 | 33 | | 13 | 23 | 28 |
| 14 | 12 | 47 | | 14 | 20 | 45 | | 14 | 23 | 27 |
| 15 | 13 | 6 | | 15 | 20 | 56 | | 15 | 23 | 26 |
| 16 | 13 | 26 | | 16 | 21 | 6 | | 16 | 23 | 25 |
| 17 | 13 | 45 | | 17 | 21 | 17 | | 17 | 23 | 24 |
| 18 | 14 | 4 | | 18 | 21 | 27 | | 18 | 23 | 22 |
| 19 | 14 | 23 | | 19 | 21 | 37 | | 19 | 23 | 19 |
| 20 | 14 | 41 | | 20 | 21 | 46 | | 20 | 23 | 15 |
| 21 | 15 | 0 | | 21 | 21 | 55 | | 21 | 23 | 12 |
| 22 | 15 | 18 | | 22 | 22 | 3 | | 22 | 23 | 8 |
| 23 | 15 | 35 | | 23 | 22 | 12 | | 23 | 23 | 3 |
| 24 | 15 | 53 | | 24 | 22 | 19 | | 24 | 22 | 59 |
| 25 | 16 | 11 | | 25 | 22 | 27 | | 25 | 22 | 54 |
| 26 | 16 | 29 | | 26 | 22 | 33 | | 26 | 22 | 48 |
| 27 | 16 | 45 | | 27 | 22 | 40 | | 27 | 22 | 42 |
| 28 | 17 | 2 | | 28 | 22 | 47 | | 28 | 22 | 35 |
| 29 | 17 | 18 | | 29 | 22 | 52 | | 29 | 22 | 29 |
| 30 | 17 | 34 | | 30 | 22 | 57 | | 30 | 22 | 22 |
| | | | | 31 | 23 | 3 | | | | |

| July. | | | | August. | | | | September. | | |
|---|---|---|---|---|---|---|---|---|---|---|
| D. | G. | M. | | D. | G. | M. | | D. | G. | M. |
| 1 | 22 | 13 | | 1 | 15 | 23 | | 1 | 4 | 39 |
| 2 | 22 | 5 | | 2 | 15 | 5 | | 2 | 4 | 16 |
| 3 | 21 | 56 | | 3 | 14 | 48 | | 3 | 3 | 53 |
| 4 | 21 | 47 | | 4 | 14 | 30 | | 4 | 3 | 31 |
| 5 | 21 | 36 | | 5 | 14 | 11 | | 5 | 3 | 7 |
| 6 | 21 | 27 | | 6 | 13 | 51 | | 6 | 2 | 44 |
| 7 | 21 | 19 | | 7 | 13 | 33 | | 7 | 2 | 20 |
| 8 | 21 | 8 | | 8 | 13 | 13 | | 8 | 1 | 58 |
| 9 | 20 | 57 | | 9 | 12 | 54 | | 9 | 1 | 34 |
| 10 | 20 | 47 | | 10 | 12 | 24 | | 10 | 1 | 10 |
| 11 | 20 | 35 | | 11 | 12 | 14 | | 11 | 0 | 48 |
| 12 | 20 | 24 | | 12 | 11 | 53 | | 12 | 0 | 24 |
| 13 | 20 | 12 | | 13 | 11 | 33 | | 13 | 0 | 0 |
| 14 | 19 | 59 | | 14 | 11 | 14 | | 14 | 0 | 24 |
| 15 | 19 | 46 | | 15 | 10 | 54 | | 15 | 0 | 47 |
| 16 | 19 | 33 | | 16 | 10 | 32 | | 16 | 1 | 11 |
| 17 | 19 | 19 | | 17 | 10 | 12 | | 17 | 1 | 34 |
| 18 | 19 | 5 | | 18 | 9 | 50 | | 18 | 1 | 58 |
| 19 | 18 | 56 | | 19 | 9 | 28 | | 19 | 2 | 21 |
| 20 | 18 | 37 | | 20 | 9 | 7 | | 20 | 2 | 44 |
| 21 | 18 | 22 | | 21 | 8 | 46 | | 21 | 3 | 8 |
| 22 | 18 | 9 | | 22 | 8 | 24 | | 22 | 3 | 32 |
| 23 | 17 | 53 | | 23 | 8 | 2 | | 23 | 3 | 55 |
| 24 | 17 | 37 | | 24 | 7 | 39 | | 24 | 4 | 18 |
| 25 | 17 | 22 | | 25 | 7 | 18 | | 25 | 4 | 41 |
| 26 | 17 | 5 | | 26 | 6 | 55 | | 26 | 5 | 3 |
| 27 | 16 | 49 | | 27 | 6 | 33 | | 27 | 5 | 27 |
| 28 | 16 | 22 | | 28 | 6 | 11 | | 28 | 5 | 50 |
| 29 | 16 | 7 | | 29 | 5 | 47 | | 29 | 6 | 13 |
| 30 | 15 | 59 | | 30 | 5 | 25 | | 30 | 6 | 36 |
| 31 | 15 | 41 | | 31 | 5 | 2 | | | | |

North declination.

North declination.

Equinoctiall.

South declination.

October.

# 1573. The first yeare.

| October. | | | | November. | | | | December. | | |
|---|---|---|---|---|---|---|---|---|---|---|
| D. | G. | M. | | D. | G. | M. | | D. | G. | M. |
| 1 | 6 | 59 | | 1 | 17 | 26 | | 1 | 23 | 3 |
| 2 | 7 | 22 | | 2 | 17 | 43 | | 2 | 23 | 8 |
| 3 | 7 | 44 | | 3 | 17 | 59 | | 3 | 23 | 12 |
| 4 | 8 | 6 | | 4 | 18 | 15 | | 4 | 23 | 15 |
| 5 | 8 | 39 | | 5 | 18 | 31 | | 5 | 23 | 19 |
| 6 | 8 | 51 | | 6 | 18 | 46 | | 6 | 23 | 22 |
| 7 | 9 | 13 | | 7 | 19 | 1 | | 7 | 23 | 24 |
| 8 | 9 | 34 | | 8 | 19 | 15 | | 8 | 23 | 25 |
| 9 | 9 | 56 | | 9 | 19 | 30 | | 9 | 23 | 26 |
| 10 | 10 | 18 | | 10 | 19 | 44 | | 10 | 23 | 27 |
| 11 | 10 | 40 | South declination. | 11 | 19 | 58 | South declination. | 11 | 23 | 28 |
| 12 | 11 | 1 | | 12 | 20 | 10 | | 12 | 23 | 28 |
| 13 | 11 | 23 | | 13 | 20 | 22 | | 13 | 23 | 28 |
| 14 | 11 | 44 | | 14 | 20 | 36 | | 14 | 23 | 27 |
| 15 | 12 | 5 | | 15 | 20 | 48 | | 15 | 23 | 26 |
| 16 | 12 | 26 | | 16 | 20 | 59 | | 16 | 23 | 25 |
| 17 | 12 | 44 | | 17 | 21 | 10 | | 17 | 23 | 24 |
| 18 | 13 | 7 | | 18 | 21 | 21 | Solstic. | 18 | 23 | 21 |
| 19 | 13 | 27 | | 19 | 21 | 33 | | 19 | 23 | 18 |
| 20 | 13 | 47 | | 20 | 21 | 41 | | 20 | 23 | 14 |
| 21 | 14 | 7 | | 21 | 21 | 51 | | 21 | 23 | 11 |
| 22 | 14 | 26 | | 22 | 21 | 59 | | 22 | 23 | 6 |
| 23 | 14 | 45 | | 23 | 22 | 8 | | 23 | 23 | 1 |
| 24 | 15 | 4 | | 24 | 22 | 17 | | 24 | 22 | 55 |
| 25 | 15 | 23 | | 25 | 22 | 25 | | 25 | 22 | 50 |
| 26 | 15 | 41 | | 26 | 22 | 32 | | 26 | 22 | 43 |
| 27 | 16 | 0 | | 27 | 22 | 39 | | 27 | 22 | 36 |
| 28 | 16 | 17 | | 28 | 22 | 46 | | 28 | 22 | 28 |
| 29 | 16 | 35 | | 29 | 22 | 52 | | 29 | 22 | 2 |
| 30 | 16 | 52 | | 30 | 22 | 57 | | 30 | 22 | 13 |
| 31 | 17 | 9 | | | | | | 31 | 22 | 4 |

# 1574. The seconde yeare.

| January. | | | | February. | | | | March. | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| D. | G. | M. | South declination. | D. | G. | M. | South declination. | D. | G. | M. | South declination. |
| 1 | 21 | 56 | | 1 | 14 | 12 | | 1 | 3 | 55 | |
| 2 | 21 | 46 | | 2 | 13 | 52 | | 2 | 3 | 32 | |
| 3 | 21 | 36 | | 3 | 13 | 32 | | 3 | 3 | 8 | |
| 4 | 21 | 26 | | 4 | 13 | 11 | | 4 | 2 | 44 | |
| 5 | 21 | 15 | | 5 | 12 | 51 | | 5 | 2 | 20 | |
| 6 | 21 | 4 | | 6 | 12 | 31 | | 6 | 1 | 57 | |
| 7 | 20 | 52 | | 7 | 12 | 10 | | 7 | 1 | 34 | |
| 8 | 20 | 41 | | 8 | 11 | 49 | | 8 | 1 | 10 | |
| 9 | 20 | 28 | | 9 | 11 | 27 | | 9 | 0 | 46 | |
| 10 | 20 | 16 | | 10 | 11 | 6 | | 10 | 0 | 22 | |
| 11 | 20 | 3 | | 11 | 10 | 44 | | 11 | 0 | 2 | |
| 12 | 19 | 49 | | 12 | 10 | 23 | Equino- | 12 | 0 | 25 | |
| 13 | 19 | 36 | | 13 | 10 | 1 | | 13 | 0 | 49 | |
| 14 | 19 | 21 | | 14 | 9 | 39 | | 14 | 1 | 13 | |
| 15 | 19 | 7 | | 15 | 9 | 17 | | 15 | 1 | 36 | |
| 16 | 18 | 52 | | 16 | 8 | 55 | ctiall. | 16 | 2 | 0 | |
| 17 | 18 | 37 | | 17 | 8 | 32 | | 17 | 2 | 23 | |
| 18 | 18 | 17 | | 18 | 8 | 10 | | 18 | 2 | 47 | |
| 19 | 18 | 1 | | 19 | 7 | 47 | North declination. | 19 | 3 | 11 | |
| 20 | 17 | 49 | | 20 | 7 | 25 | | 20 | 3 | 34 | |
| 21 | 17 | 32 | | 21 | 7 | 2 | | 21 | 3 | 56 | |
| 22 | 17 | 15 | | 22 | 6 | 39 | | 22 | 4 | 20 | |
| 23 | 16 | 57 | | 23 | 6 | 16 | | 23 | 4 | 43 | |
| 24 | 16 | 40 | | 24 | 5 | 52 | | 24 | 5 | 7 | |
| 25 | 16 | 23 | | 25 | 5 | 29 | | 25 | 5 | 29 | |
| 26 | 16 | 5 | | 26 | 5 | 6 | | 26 | 5 | 52 | |
| 27 | 15 | 47 | | 27 | 4 | 42 | | 27 | 6 | 16 | |
| 28 | 15 | 28 | | 28 | 4 | 19 | | 28 | 6 | 38 | |
| 29 | 15 | 10 | | | | | | 29 | 7 | 1 | |
| 30 | 14 | 51 | | | | | | 30 | 7 | 23 | |
| 31 | 14 | 31 | | | | | | 31 | 7 | 46 | |

Aprill.

| Aprill. | | | | May. | | | | Iune. | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| D. | G. | M. | | D. | G. | M. | | D. | G. | M. | |
| 1 | 8 | 9 | North declination. | 1 | 17 | 46 | North declination. — Solstic. | 1 | 23 | 6 | |
| 2 | 8 | 30 | | 2 | 18 | 1 | | 2 | 23 | 11 | |
| 3 | 8 | 51 | | 3 | 18 | 17 | | 3 | 23 | 14 | |
| 4 | 9 | 14 | | 4 | 18 | 32 | | 4 | 23 | 17 | |
| 5 | 9 | 35 | | 5 | 18 | 46 | | 5 | 23 | 20 | |
| 6 | 9 | 56 | | 6 | 19 | 1 | | 6 | 23 | 23 | |
| 7 | 10 | 18 | | 7 | 19 | 14 | | 7 | 23 | 25 | |
| 8 | 10 | 39 | | 8 | 19 | 28 | | 8 | 23 | 26 | |
| 9 | 10 | 59 | | 9 | 19 | 41 | | 9 | 23 | 27 | |
| 10 | 11 | 20 | | 10 | 19 | 54 | | 10 | 23 | 27 | |
| 11 | 11 | 41 | | 11 | 20 | 6 | | 11 | 23 | 28 | |
| 12 | 12 | 1 | | 12 | 20 | 18 | | 12 | 23 | 28 | |
| 13 | 12 | 21 | | 13 | 20 | 30 | | 13 | 23 | 28 | |
| 14 | 12 | 41 | | 14 | 20 | 41 | | 14 | 23 | 27 | |
| 15 | 13 | 1 | | 15 | 20 | 53 | | 15 | 23 | 26 | |
| 16 | 13 | 21 | | 16 | 21 | 3 | | 16 | 23 | 25 | |
| 17 | 13 | 40 | | 17 | 21 | 14 | | 17 | 23 | 24 | |
| 18 | 14 | 0 | | 18 | 21 | 25 | | 18 | 23 | 22 | |
| 19 | 14 | 18 | | 19 | 21 | 34 | | 19 | 23 | 20 | |
| 20 | 14 | 37 | | 20 | 21 | 43 | | 20 | 23 | 16 | |
| 21 | 14 | 55 | | 21 | 21 | 52 | | 21 | 23 | 12 | |
| 22 | 15 | 13 | | 22 | 22 | 1 | | 22 | 23 | 9 | |
| 23 | 15 | 30 | | 23 | 22 | 9 | | 23 | 23 | 5 | |
| 24 | 15 | 48 | | 24 | 22 | 17 | | 24 | 23 | 0 | |
| 25 | 16 | 6 | | 25 | 22 | 25 | | 25 | 22 | 54 | |
| 26 | 16 | 23 | | 26 | 22 | 31 | | 26 | 22 | 49 | |
| 27 | 16 | 40 | | 27 | 22 | 38 | | 27 | 22 | 43 | |
| 28 | 16 | 57 | | 28 | 22 | 45 | | 28 | 22 | 36 | |
| 29 | 17 | 13 | | 29 | 22 | 52 | | 29 | 22 | 29 | |
| 30 | 17 | 30 | | 30 | 22 | 58 | | 30 | 22 | 22 | |
| | | | | 31 | 23 | 1 | | | | | |

| July. | | | | August. | | | | September. | | |
|---|---|---|---|---|---|---|---|---|---|---|
| D. | G. | M. | | D. | G. | M. | | D. | G. | M. |
| 1 | 22 | 14 | North declination. | 1 | 15 | 28 | North declination. | 1 | 4 | 45 |
| 2 | 22 | 6 | | 2 | 15 | 10 | | 2 | 4 | 22 |
| 3 | 21 | 58 | | 3 | 14 | 51 | | 3 | 3 | 58 |
| 4 | 21 | 49 | | 4 | 14 | 33 | | 4 | 3 | 36 |
| 5 | 21 | 40 | | 5 | 14 | 16 | | 5 | 3 | 13 |
| 6 | 21 | 31 | | 6 | 13 | 58 | | 6 | 2 | 49 |
| 7 | 21 | 21 | | 7 | 13 | 38 | | 7 | 2 | 26 |
| 8 | 21 | 11 | | 8 | 13 | 18 | | 8 | 2 | 4 |
| 9 | 21 | 0 | | 9 | 12 | 58 | | 9 | 1 | 42 |
| 10 | 20 | 49 | | 10 | 12 | 39 | | 10 | 1 | 18 |
| 11 | 20 | 38 | | 11 | 12 | 19 | | 11 | 0 | 56 |
| 12 | 20 | 26 | | 12 | 11 | 59 | Equinoctiall. | 12 | 0 | 32 |
| 13 | 20 | 13 | | 13 | 11 | 39 | | 13 | 0 | 7 |
| 14 | 20 | 2 | | 14 | 11 | 19 | | 14 | 0 | 17 |
| 15 | 19 | 55 | | 15 | 10 | 58 | | 15 | 0 | 41 |
| 16 | 19 | 37 | | 16 | 10 | 36 | | 16 | 1 | 3 |
| 17 | 19 | 23 | | 17 | 10 | 16 | | 17 | 1 | 27 |
| 18 | 19 | 9 | | 18 | 9 | 54 | South declination. | 18 | 1 | 51 |
| 19 | 18 | 55 | | 19 | 9 | 34 | | 19 | 2 | 15 |
| 20 | 18 | 42 | | 20 | 9 | 12 | | 20 | 2 | 38 |
| 21 | 18 | 26 | | 21 | 8 | 50 | | 21 | 5 | 1 |
| 22 | 18 | 12 | | 22 | 8 | 28 | | 22 | 3 | 24 |
| 23 | 17 | 56 | | 23 | 8 | 7 | | 23 | 3 | 48 |
| 24 | 17 | 41 | | 24 | 7 | 45 | | 24 | 4 | 11 |
| 25 | 17 | 25 | | 25 | 7 | 24 | | 25 | 4 | 34 |
| 26 | 17 | 9 | | 26 | 7 | 2 | | 26 | 4 | 57 |
| 27 | 16 | 52 | | 27 | 6 | 39 | | 27 | 5 | 20 |
| 28 | 16 | 36 | | 28 | 6 | 16 | | 28 | 5 | 44 |
| 29 | 16 | 20 | | 29 | 5 | 53 | | 29 | 6 | 7 |
| 30 | 16 | 2 | | 30 | 5 | 31 | | 30 | 6 | 30 |
| 31 | 15 | 45 | | 31 | 5 | 8 | | | | |

| October. | | | South declination. | November. | | | Solstic. — South declination. | December. | | |
|---|---|---|---|---|---|---|---|---|---|---|
| D. | G. | M. | | D. | G. | M. | | D. | G. | M. |
| 1 | 6 | 53 | | 1 | 17 | 22 | | 1 | 23 | 2 |
| 2 | 7 | 16 | | 2 | 17 | 39 | | 2 | 23 | 7 |
| 3 | 7 | 39 | | 3 | 17 | 55 | | 3 | 23 | 12 |
| 4 | 8 | 0 | | 4 | 18 | 11 | | 4 | 23 | 15 |
| 5 | 8 | 23 | | 5 | 18 | 27 | | 5 | 23 | 18 |
| 6 | 8 | 45 | | 6 | 18 | 42 | | 6 | 23 | 22 |
| 7 | 9 | 8 | | 7 | 18 | 57 | | 7 | 23 | 25 |
| 8 | 9 | 30 | | 8 | 19 | 11 | | 8 | 23 | 26 |
| 9 | 9 | 52 | | 9 | 19 | 25 | | 9 | 23 | 26 |
| 10 | 10 | 13 | | 10 | 19 | 39 | | 10 | 23 | 27 |
| 11 | 10 | 35 | | 11 | 19 | 53 | | 11 | 23 | 28 |
| 12 | 10 | 56 | | 12 | 20 | 6 | | 12 | 23 | 28 |
| 13 | 11 | 18 | | 13 | 20 | 19 | | 13 | 23 | 28 |
| 14 | 11 | 39 | | 14 | 20 | 32 | | 14 | 23 | 27 |
| 15 | 12 | 0 | | 15 | 20 | 44 | | 15 | 23 | 26 |
| 16 | 12 | 21 | | 16 | 20 | 56 | | 16 | 23 | 25 |
| 17 | 12 | 42 | | 17 | 21 | 6 | | 17 | 23 | 24 |
| 18 | 13 | 2 | | 18 | 21 | 17 | | 18 | 23 | 22 |
| 19 | 13 | 22 | | 19 | 21 | 28 | | 19 | 23 | 19 |
| 20 | 13 | 42 | | 20 | 21 | 38 | | 20 | 23 | 15 |
| 21 | 14 | 2 | | 21 | 21 | 48 | | 21 | 23 | 12 |
| 22 | 14 | 22 | | 22 | 21 | 57 | | 22 | 23 | 8 |
| 23 | 14 | 41 | | 23 | 22 | 6 | | 23 | 23 | 2 |
| 24 | 15 | 0 | | 24 | 22 | 15 | | 24 | 22 | 56 |
| 25 | 15 | 19 | | 25 | 22 | 23 | | 25 | 22 | 51 |
| 26 | 15 | 37 | | 26 | 22 | 31 | | 26 | 22 | 45 |
| 27 | 15 | 56 | | 27 | 22 | 37 | | 27 | 22 | 37 |
| 28 | 16 | 14 | | 28 | 22 | 44 | | 28 | 22 | 30 |
| 29 | 16 | 31 | | 29 | 22 | 51 | | 29 | 22 | 23 |
| 30 | 16 | 48 | | 30 | 22 | 57 | | 30 | 22 | 15 |
| 31 | 17 | 5 | | | | | | 31 | 22 | 7 |

## 1575. The thirde yeare.

| Ianuarie. | | | | Februarie. | | | | Marche. | | |
|---|---|---|---|---|---|---|---|---|---|---|
| D. | G. | M. | | D. | G. | M. | | D. | G. | M. |
| 1 | 21 | 57 | South declination. | 1 | 14 | 17 | South declination. | 1 | 4 | 2 |
| 2 | 21 | 48 | | 2 | 13 | 57 | | 2 | 3 | 38 |
| 3 | 21 | 38 | | 3 | 13 | 37 | | 3 | 3 | 15 |
| 4 | 21 | 28 | | 4 | 13 | 15 | | 4 | 2 | 51 |
| 5 | 21 | 18 | | 5 | 12 | 56 | | 5 | 2 | 27 |
| 6 | 21 | 6 | | 6 | 12 | 35 | | 6 | 2 | 3 |
| 7 | 20 | 55 | | 7 | 12 | 15 | | 7 | 1 | 40 |
| 8 | 20 | 44 | | 8 | 11 | 54 | | 8 | 1 | 16 |
| 9 | 20 | 31 | | 9 | 11 | 33 | | 9 | 0 | 52 |
| 10 | 20 | 19 | | 10 | 11 | 12 | | 10 | 0 | 28 |
| 11 | 20 | 5 | | 11 | 10 | 51 | Equino- | 11 | 0 | 4 |
| 12 | 19 | 52 | | 12 | 10 | 29 | | 12 | 0 | 20 |
| 13 | 19 | 39 | | 13 | 10 | 7 | | 13 | 0 | 44 |
| 14 | 19 | 24 | | 14 | 9 | 45 | | 14 | 1 | 8 |
| 15 | 19 | 10 | | 15 | 9 | 22 | ctiall. | 15 | 1 | 32 |
| 16 | 18 | 56 | | 16 | 9 | 0 | | 16 | 1 | 55 |
| 17 | 18 | 40 | | 17 | 8 | 38 | North declination. | 17 | 2 | 18 |
| 18 | 18 | 24 | | 18 | 8 | 15 | | 18 | 2 | 41 |
| 19 | 18 | 9 | | 19 | 7 | 53 | | 19 | 3 | 5 |
| 20 | 17 | 53 | | 20 | 7 | 30 | | 20 | 3 | 29 |
| 21 | 17 | 36 | | 21 | 7 | 8 | | 21 | 3 | 52 |
| 22 | 17 | 20 | | 22 | 6 | 45 | | 22 | 4 | 14 |
| 23 | 17 | 2 | | 23 | 6 | 22 | | 23 | 4 | 38 |
| 24 | 16 | 45 | | 24 | 5 | 59 | | 24 | 5 | 1 |
| 25 | 16 | 27 | | 25 | 5 | 35 | | 25 | 5 | 24 |
| 26 | 16 | 10 | | 26 | 5 | 12 | | 26 | 5 | 47 |
| 27 | 15 | 51 | | 27 | 4 | 49 | | 27 | 6 | 10 |
| 28 | 15 | 33 | | 28 | 4 | 25 | | 28 | 6 | 33 |
| 29 | 15 | 13 | | | | | | 29 | 6 | 56 |
| 30 | 14 | 55 | | | | | | 30 | 7 | 19 |
| 31 | 14 | 35 | | | | | | 31 | 7 | 40 |

Aprill.

| April. | | | North declination. | May. | | | Solstic. — North declination. | Iune. | | |
|---|---|---|---|---|---|---|---|---|---|---|
| D. | G. | M. | | D. | G. | M. | | D. | G. | M. |
| 1 | 8 | 1 | | 1 | 17 | 43 | | 1 | 23 | 5 |
| 2 | 8 | 24 | | 2 | 17 | 59 | | 2 | 23 | 10 |
| 3 | 8 | 46 | | 3 | 18 | 14 | | 3 | 23 | 13 |
| 4 | 9 | 8 | | 4 | 18 | 28 | | 4 | 23 | 16 |
| 5 | 9 | 30 | | 5 | 18 | 42 | | 5 | 23 | 20 |
| 6 | 9 | 52 | | 6 | 18 | 57 | | 6 | 23 | 23 |
| 7 | 10 | 12 | | 7 | 19 | 11 | | 7 | 23 | 24 |
| 8 | 10 | 34 | | 8 | 19 | 24 | | 8 | 23 | 25 |
| 9 | 10 | 57 | | 9 | 19 | 38 | | 9 | 23 | 26 |
| 10 | 11 | 16 | | 10 | 19 | 51 | | 10 | 23 | 27 |
| 11 | 11 | 36 | | 11 | 20 | 3 | | 11 | 23 | 28 |
| 12 | 11 | 50 | | 12 | 20 | 15 | | 12 | 23 | 28 |
| 13 | 12 | 17 | | 13 | 20 | 28 | | 13 | 23 | 28 |
| 14 | 12 | 37 | | 14 | 20 | 39 | | 14 | 23 | 27 |
| 15 | 12 | 57 | | 15 | 20 | 51 | | 15 | 23 | 26 |
| 16 | 13 | 16 | | 16 | 21 | 1 | | 16 | 23 | 25 |
| 17 | 13 | 35 | | 17 | 21 | 12 | | 17 | 23 | 24 |
| 18 | 13 | 54 | | 18 | 21 | 22 | | 18 | 23 | 22 |
| 19 | 14 | 14 | | 19 | 21 | 32 | | 19 | 23 | 20 |
| 20 | 14 | 32 | | 20 | 21 | 42 | | 20 | 23 | 17 |
| 21 | 14 | 51 | | 21 | 21 | 51 | | 21 | 23 | 13 |
| 22 | 15 | 10 | | 22 | 22 | 0 | | 22 | 23 | 10 |
| 23 | 15 | 27 | | 23 | 22 | 8 | | 23 | 23 | 6 |
| 24 | 15 | 46 | | 24 | 22 | 16 | | 24 | 23 | 1 |
| 25 | 16 | 4 | | 25 | 22 | 24 | | 25 | 22 | 55 |
| 26 | 16 | 22 | | 26 | 22 | 30 | | 26 | 22 | 50 |
| 27 | 16 | 38 | | 27 | 22 | 37 | | 27 | 22 | 44 |
| 28 | 16 | 54 | | 28 | 22 | 43 | | 28 | 22 | 37 |
| 29 | 17 | 10 | | 29 | 22 | 50 | | 29 | 22 | 31 |
| 30 | 17 | 27 | | 30 | 22 | 55 | | 30 | 22 | 24 |
| | | | | 31 | 23 | 0 | | | | |

| July. | | | | August. | | | | September. | | |
|---|---|---|---|---|---|---|---|---|---|---|
| D. | G. | M. | | D. | G. | M. | | D. | G. | M. |
| 1 | 22 | 16 | | 1 | 15 | 30 | | 1 | 4 | 54 |
| 2 | 22 | 9 | | 2 | 15 | 13 | | 2 | 4 | 28 |
| 3 | 22 | 0 | | 3 | 14 | 56 | | 3 | 4 | 5 |
| 4 | 21 | 51 | | 4 | 14 | 49 | | 4 | 3 | 41 |
| 5 | 21 | 43 | | 5 | 14 | 20 | | 5 | 3 | 18 |
| 6 | 21 | 33 | | 6 | 14 | 1 | | 6 | 2 | 55 |
| 7 | 21 | 23 | | 7 | 13 | 42 | | 7 | 2 | 31 |
| 8 | 21 | 12 | | 8 | 13 | 22 | | 8 | 2 | 8 |
| 9 | 21 | 2 | | 9 | 13 | 3 | | 9 | 1 | 47 |
| 10 | 20 | 52 | | 10 | 12 | 43 | | 10 | 1 | 23 |
| 11 | 20 | 42 | | 11 | 12 | 23 | | 11 | 0 | 59 |
| 12 | 20 | 30 | | 12 | 12 | 2 | | 12 | 0 | 36 |
| 13 | 20 | 18 | | 13 | 11 | 42 | | 13 | 0 | 12 |
| 14 | 20 | 6 | | 14 | 11 | 23 | | 14 | 0 | 12 |
| 15 | 19 | 57 | | 15 | 11 | 2 | | 15 | 0 | 36 |
| 16 | 19 | 40 | | 16 | 10 | 41 | | 16 | 0 | 59 |
| 17 | 19 | 26 | | 17 | 10 | 20 | | 17 | 1 | 23 |
| 18 | 19 | 13 | | 18 | 9 | 58 | | 18 | 1 | 47 |
| 19 | 19 | 0 | | 19 | 9 | 38 | | 19 | 2 | 10 |
| 20 | 18 | 45 | | 20 | 9 | 17 | | 20 | 2 | 33 |
| 21 | 18 | 30 | | 21 | 8 | 56 | | 21 | 2 | 56 |
| 22 | 18 | 15 | | 22 | 8 | 33 | | 22 | 3 | 20 |
| 23 | 18 | 0 | | 23 | 8 | 12 | | 23 | 3 | 43 |
| 24 | 17 | 45 | | 24 | 7 | 50 | | 24 | 4 | 6 |
| 25 | 17 | 29 | | 25 | 7 | 28 | | 25 | 4 | 30 |
| 26 | 17 | 14 | | 26 | 7 | 5 | | 26 | 4 | 52 |
| 27 | 16 | 57 | | 27 | 6 | 43 | | 27 | 5 | 16 |
| 28 | 16 | 40 | | 28 | 6 | 20 | | 28 | 5 | 39 |
| 29 | 16 | 24 | | 29 | 5 | 58 | | 29 | 6 | 2 |
| 30 | 16 | 6 | | 30 | 5 | 35 | | 30 | 6 | 25 |
| 31 | 15 | 49 | | 31 | 5 | 14 | | | | |

North declination.

North declination.

Equino-

ctiall.

South declination.

October.

## 1575. The thirde yeare.

| October. | | | | November. | | | | December. | | |
|---|---|---|---|---|---|---|---|---|---|---|
| D. | G. | M. | | D. | G. | M. | | D. | G. | M. |
| 1 | 6 | 48 | | 1 | 17 | 16 | | 1 | 23 | 0 |
| 2 | 7 | 10 | | 2 | 17 | 33 | | 2 | 23 | 6 |
| 3 | 7 | 34 | | 3 | 17 | 49 | | 3 | 23 | 11 |
| 4 | 7 | 55 | | 4 | 18 | 5 | | 4 | 23 | 15 |
| 5 | 8 | 18 | | 5 | 18 | 22 | | 5 | 23 | 18 |
| 6 | 8 | 40 | | 6 | 18 | 37 | | 6 | 23 | 21 |
| 7 | 9 | 3 | | 7 | 18 | 52 | | 7 | 23 | 24 |
| 8 | 9 | 25 | | 8 | 19 | 7 | | 8 | 23 | 26 |
| 9 | 9 | 46 | | 9 | 19 | 21 | Solstic. | 9 | 23 | 27 |
| 10 | 10 | 8 | | 10 | 19 | 35 | — | 10 | 23 | 27 |
| 11 | 10 | 30 | South declination. | 11 | 19 | 49 | South declination. | 11 | 23 | 28 |
| 12 | 10 | 53 | | 12 | 20 | 2 | | 12 | 23 | 28 |
| 13 | 11 | 13 | | 13 | 20 | 15 | | 13 | 23 | 28 |
| 14 | 11 | 33 | | 14 | 20 | 28 | | 14 | 23 | 27 |
| 15 | 11 | 54 | | 15 | 20 | 40 | | 15 | 23 | 27 |
| 16 | 12 | 15 | | 16 | 20 | 53 | | 16 | 23 | 26 |
| 17 | 12 | 34 | | 17 | 21 | 4 | | 17 | 23 | 25 |
| 18 | 12 | 56 | | 18 | 21 | 15 | | 18 | 23 | 23 |
| 19 | 13 | 16 | | 19 | 21 | 26 | | 19 | 23 | 21 |
| 20 | 13 | 36 | | 20 | 21 | 36 | | 20 | 23 | 16 |
| 21 | 13 | 56 | | 21 | 21 | 45 | | 21 | 23 | 12 |
| 22 | 14 | 16 | | 22 | 21 | 54 | | 22 | 23 | 8 |
| 23 | 14 | 35 | | 23 | 22 | 3 | | 23 | 23 | 3 |
| 24 | 14 | 57 | | 24 | 22 | 12 | | 24 | 22 | 57 |
| 25 | 15 | 12 | | 25 | 22 | 20 | | 25 | 22 | 52 |
| 26 | 15 | 30 | | 26 | 22 | 28 | | 26 | 22 | 46 |
| 27 | 15 | 49 | | 27 | 22 | 35 | | 27 | 22 | 39 |
| 28 | 16 | 7 | | 28 | 22 | 42 | | 28 | 22 | 32 |
| 29 | 16 | 25 | | 29 | 22 | 49 | | 29 | 22 | 25 |
| 30 | 16 | 42 | | 30 | 22 | 55 | | 30 | 22 | 17 |
| 31 | 16 | 59 | | | | | | 31 | 22 | 8 |

| January. | | | | February. | | | | March. | | |
|---|---|---|---|---|---|---|---|---|---|---|
| D. | G. | M. | | D. | G. | M. | | D. | G. | M. |
| 1 | 21 | 55 | South declination. | 1 | 14 | 21 | South declination. | 1 | 3 | 44 |
| 2 | 21 | 50 | | 2 | 14 | 2 | | 2 | 3 | 21 |
| 3 | 21 | 41 | | 3 | 13 | 42 | | 3 | 2 | 57 |
| 4 | 21 | 31 | | 4 | 13 | 22 | | 4 | 2 | 33 |
| 5 | 21 | 20 | | 5 | 13 | 2 | | 5 | 2 | 9 |
| 6 | 21 | 9 | | 6 | 12 | 41 | | 6 | 1 | 46 |
| 7 | 20 | 58 | | 7 | 12 | 21 | | 7 | 1 | 22 |
| 8 | 20 | 47 | | 8 | 12 | 0 | | 8 | 0 | 58 |
| 9 | 20 | 34 | | 9 | 11 | 39 | | 9 | 0 | 34 |
| 10 | 20 | 22 | | 10 | 11 | 18 | | 10 | 0 | 10 |
| 11 | 20 | 9 | | 11 | 10 | 57 | | 11 | 0 | 14 |
| 12 | 19 | 56 | | 12 | 10 | 35 | Equino- | 12 | 0 | 38 |
| 13 | 19 | 43 | | 13 | 10 | 13 | | 13 | 1 | 50 |
| 14 | 19 | 28 | | 14 | 9 | 51 | | 14 | 1 | 24 |
| 15 | 19 | 13 | | 15 | 9 | 28 | | 15 | 1 | 48 |
| 16 | 18 | 59 | | 16 | 9 | 6 | ctiall. | 16 | 2 | 12 |
| 17 | 18 | 44 | | 17 | 8 | 44 | | 17 | 2 | 35 |
| 18 | 18 | 29 | | 18 | 8 | 21 | | 18 | 2 | 59 |
| 19 | 18 | 14 | | 19 | 7 | 59 | North declination. | 19 | 3 | 22 |
| 20 | 17 | 57 | | 20 | 7 | 36 | | 20 | 3 | 46 |
| 21 | 17 | 41 | | 21 | 7 | 14 | | 21 | 4 | 9 |
| 22 | 17 | 25 | | 22 | 6 | 51 | | 22 | 4 | 32 |
| 23 | 17 | 7 | | 23 | 6 | 28 | | 23 | 4 | 55 |
| 24 | 16 | 50 | | 24 | 6 | 5 | | 24 | 5 | 19 |
| 25 | 16 | 32 | | 25 | 5 | 41 | | 25 | 5 | 41 |
| 26 | 16 | 14 | | 26 | 5 | 18 | | 26 | 6 | 3 |
| 27 | 15 | 56 | | 27 | 4 | 55 | | 27 | 6 | 27 |
| 28 | 15 | 38 | | 28 | 4 | 3 | | 28 | 6 | 50 |
| 29 | 15 | 18 | | 29 | 4 | 8 | | 29 | 7 | 13 |
| 30 | 15 | 0 | | | | | | 30 | 7 | 35 |
| 31 | 14 | 41 | | | | | | 31 | 7 | 57 |

North declination. Solstic.

| Apryll. D. | G. | M. | May. D. | G. | M. | June. D. | G. | M. |
|---|---|---|---|---|---|---|---|---|
| 1 | 8 | 20 | 1 | 17 | 54 | 1 | 23 | 8 |
| 2 | 8 | 41 | 2 | 18 | 9 | 2 | 23 | 12 |
| 3 | 9 | 3 | 3 | 18 | 24 | 3 | 23 | 15 |
| 4 | 9 | 25 | 4 | 18 | 38 | 4 | 23 | 19 |
| 5 | 9 | 46 | 5 | 18 | 53 | 5 | 23 | 22 |
| 6 | 10 | 8 | 6 | 19 | 7 | 6 | 23 | 24 |
| 7 | 10 | 29 | 7 | 19 | 21 | 7 | 23 | 25 |
| 8 | 10 | 50 | 8 | 19 | 34 | 8 | 23 | 26 |
| 9 | 11 | 11 | 9 | 19 | 48 | 9 | 23 | 27 |
| 10 | 11 | 31 | 10 | 20 | 0 | 10 | 23 | 28 |
| 11 | 11 | 51 | 11 | 20 | 12 | 11 | 23 | 28 |
| 12 | 12 | 12 | 12 | 20 | 25 | 12 | 23 | 28 |
| 13 | 12 | 33 | 13 | 20 | 37 | 13 | 23 | 27 |
| 14 | 12 | 52 | 14 | 20 | 48 | 14 | 23 | 27 |
| 15 | 13 | 12 | 15 | 20 | 58 | 15 | 23 | 26 |
| 16 | 13 | 32 | 16 | 21 | 9 | 16 | 23 | 25 |
| 17 | 13 | 51 | 17 | 21 | 20 | 17 | 23 | 24 |
| 18 | 14 | 11 | 18 | 21 | 30 | 18 | 23 | 21 |
| 19 | 14 | 29 | 19 | 21 | 39 | 19 | 23 | 18 |
| 20 | 14 | 47 | 20 | 21 | 48 | 20 | 23 | 14 |
| 21 | 15 | 5 | 21 | 21 | 57 | 21 | 23 | 11 |
| 22 | 15 | 24 | 22 | 22 | 5 | 22 | 23 | 7 |
| 23 | 15 | 41 | 23 | 22 | 14 | 23 | 23 | 2 |
| 24 | 16 | 0 | 24 | 22 | 22 | 24 | 22 | 56 |
| 25 | 16 | 18 | 25 | 22 | 29 | 25 | 22 | 51 |
| 26 | 16 | 34 | 26 | 22 | 35 | 26 | 22 | 46 |
| 27 | 16 | 50 | 27 | 22 | 41 | 27 | 22 | 39 |
| 28 | 17 | 6 | 28 | 22 | 48 | 28 | 22 | 32 |
| 29 | 17 | 22 | 29 | 22 | 54 | 29 | 22 | 26 |
| 30 | 17 | 39 | 30 | 22 | 58 | 30 | 22 | 18 |
| | | | 31 | 23 | 3 | | | |

| July. | | | | August. | | | | September. | | |
|---|---|---|---|---|---|---|---|---|---|---|
| D. | G. | M. | | D. | G. | M. | | D. | G. | M. |
| 1 | 22 | 10 | | 1 | 15 | 17 | | 1 | 4 | 33 |
| 2 | 22 | 2 | | 2 | 15 | 0 | | 2 | 4 | 10 |
| 3 | 21 | 53 | | 3 | 14 | 42 | | 3 | 3 | 47 |
| 4 | 21 | 45 | | 4 | 14 | 23 | | 4 | 3 | 24 |
| 5 | 21 | 36 | | 5 | 14 | 5 | | 5 | 3 | 0 |
| 6 | 21 | 26 | | 6 | 13 | 46 | | 6 | 2 | 37 |
| 7 | 21 | 16 | | 7 | 13 | 26 | | 7 | 2 | 13 |
| 8 | 21 | 6 | | 8 | 13 | 7 | | 8 | 1 | 52 |
| 9 | 20 | 55 | | 9 | 12 | 48 | | 9 | 1 | 28 |
| 10 | 20 | 44 | | 10 | 12 | 28 | | 10 | 1 | 4 |
| 11 | 20 | 32 | | 11 | 12 | 8 | | 11 | 0 | 41 |
| 12 | 20 | 21 | | 12 | 11 | 47 | | 12 | 0 | 18 |
| 13 | 20 | 9 | | 13 | 11 | 28 | | 13 | 0 | 6 |
| 14 | 19 | 56 | | 14 | 11 | 7 | | 14 | 0 | 30 |
| 15 | 19 | 43 | | 15 | 10 | 46 | | 15 | 0 | 53 |
| 16 | 19 | 30 | | 16 | 10 | 26 | | 16 | 1 | 17 |
| 17 | 19 | 16 | | 17 | 10 | 4 | | 17 | 1 | 40 |
| 18 | 19 | 2 | | 18 | 9 | 43 | | 18 | 2 | 4 |
| 19 | 18 | 48 | | 19 | 9 | 21 | | 19 | 2 | 26 |
| 20 | 18 | 34 | | 20 | 8 | 59 | | 20 | 2 | 50 |
| 21 | 18 | 19 | | 21 | 8 | 37 | | 21 | 3 | 13 |
| 22 | 18 | 4 | | 22 | 8 | 16 | | 22 | 3 | 37 |
| 23 | 17 | 48 | | 23 | 7 | 56 | | 23 | 4 | 0 |
| 24 | 17 | 33 | | 24 | 7 | 33 | | 24 | 4 | 23 |
| 25 | 17 | 19 | | 25 | 7 | 11 | | 25 | 4 | 46 |
| 26 | 17 | 2 | | 26 | 6 | 49 | | 26 | 5 | 9 |
| 27 | 16 | 45 | | 27 | 6 | 26 | | 27 | 5 | 32 |
| 28 | 16 | 28 | | 28 | 6 | 3 | | 28 | 5 | 55 |
| 29 | 16 | 11 | | 29 | 5 | 40 | | 29 | 6 | 19 |
| 30 | 15 | 53 | | 30 | 5 | 19 | | 30 | 6 | 42 |
| 31 | 15 | 36 | | 31 | 4 | 57 | | | | |

North declination.

North declination.

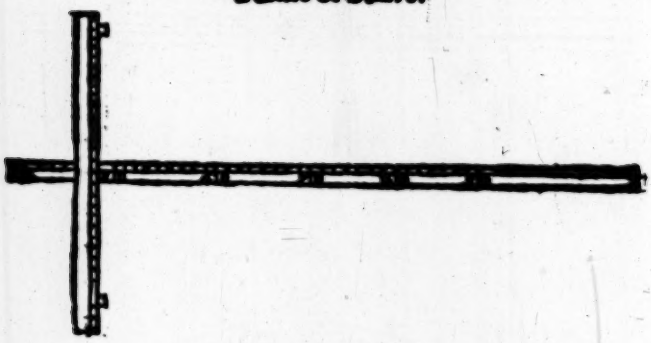
Equinoctiall.

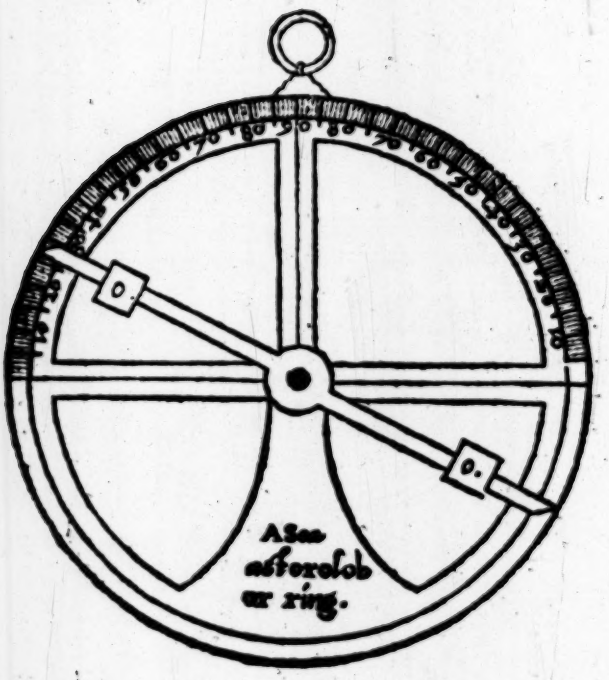
South declination.

October.

| October. | | | | November. | | | | December. | | |
|---|---|---|---|---|---|---|---|---|---|---|
| D. | G. | M. | | D. | G. | M. | | D. | G. | M. |
| 1 | 7 | 5 | South declination. | 1 | 17 | 31 | Solstic. — South declination. | 1 | 23 | 5 |
| 2 | 7 | 27 | | 2 | 17 | 47 | | 2 | 23 | 10 |
| 3 | 7 | 49 | | 3 | 18 | 3 | | 3 | 23 | 13 |
| 4 | 8 | 12 | | 4 | 18 | 19 | | 4 | 23 | 16 |
| 5 | 8 | 34 | | 5 | 18 | 34 | | 5 | 23 | 20 |
| 6 | 8 | 56 | | 6 | 18 | 49 | | 6 | 23 | 23 |
| 7 | 9 | 18 | | 7 | 19 | 4 | | 7 | 23 | 25 |
| 8 | 9 | 46 | | 8 | 19 | 18 | | 8 | 23 | 26 |
| 9 | 10 | 2 | | 9 | 19 | 32 | | 9 | 23 | 27 |
| 10 | 10 | 24 | | 10 | 19 | 46 | | 10 | 23 | 27 |
| 11 | 10 | 45 | | 11 | 20 | 0 | | 11 | 23 | 28 |
| 12 | 11 | 7 | | 12 | 20 | 13 | | 12 | 23 | 28 |
| 13 | 11 | 28 | | 13 | 20 | 26 | | 13 | 23 | 28 |
| 14 | 11 | 49 | | 14 | 20 | 37 | | 14 | 23 | 27 |
| 15 | 12 | 10 | | 15 | 20 | 50 | | 15 | 23 | 26 |
| 16 | 12 | 31 | | 16 | 21 | 1 | | 16 | 23 | 25 |
| 17 | 12 | 51 | | 17 | 21 | 12 | | 17 | 23 | 24 |
| 18 | 13 | 11 | | 18 | 21 | 23 | | 18 | 23 | 21 |
| 19 | 13 | 31 | | 19 | 21 | 33 | | 19 | 23 | 18 |
| 20 | 13 | 51 | | 20 | 21 | 43 | | 20 | 23 | 13 |
| 21 | 14 | 11 | | 21 | 21 | 52 | | 21 | 23 | 9 |
| 22 | 14 | 30 | | 22 | 22 | 1 | | 22 | 23 | 6 |
| 23 | 14 | 50 | | 23 | 22 | 11 | | 23 | 23 | 0 |
| 24 | 15 | 9 | | 24 | 22 | 19 | | 24 | 22 | 54 |
| 25 | 15 | 27 | | 25 | 22 | 27 | | 25 | 22 | 49 |
| 26 | 15 | 46 | | 26 | 22 | 34 | | 26 | 22 | 43 |
| 27 | 16 | 4 | | 27 | 22 | 41 | | 27 | 22 | 35 |
| 28 | 16 | 22 | | 28 | 22 | 48 | | 28 | 22 | 28 |
| 29 | 16 | 39 | | 29 | 22 | 51 | | 29 | 22 | 21 |
| 30 | 16 | 56 | | 30 | 22 | 59 | | 30 | 22 | 13 |
| 31 | 17 | 14 | | | | | | 31 | 22 | 4 |

## ¶ The Balla Stella or Croſſe ſtaffe: to take the heigth of the Sunne or Starre.





# ¶ The ſixt Chapter or rule ſheweth, howe to take the heigth of the Sun with the croſſe ſtaffe or with the Aſtrolobe, and alſo how to find the true Meridian, with other neceſſarie matters.

TO take the true heigth of the Sunne at the Sea, the beſte way is, to doe it wyth the croſſe ſtaffe: for that the Sea is moueable, and cauſeth the Shippe to heaue, and ſette little or much: And alſo vpon the croſſe ſtaffe the degrees be larger marked than the Ring or Aſtrolobe: and in a large inſtrument an errour is ſeene ſoner and better than it is in a ſmall inſtrument.

Howe to obſerue ỳ ſun.

Nowe to take the heigth of the Sunne, to knowe thy Altitude of the Pole aboue the Horizon, doe this: Firſte ſet the Sunne with a compaſſe, to knowe when that the Sunne commeth neare vnto the Meridian: as ſoone as you ſee that the Sunne is come vnto the South and by Eaſt, then beginne to take the heigth of the Sunne with the croſſe ſtaffe in this manner: Put the Tranſitorie vpon the long ſtaffe, then ſet the end of the long ſtaffe cloſe at the corner of your eye, winking with your other eye, and remouing the Tranſitorie forwardes or backwardes, vntill you doe ſee the lower ende of it (being iuſt with the Horizon) and the vpper ende of it, (being iuſt with the middle of the Sunne) both to agree with the Sunne and the Horizon at one time: and ſo haue you the true heigth of the Sunne: this done, ſtil obſerue ỳ ſame, vntil you ſee the Sunne at the higheſt and beginning to deſcende, and then haue you finiſhed. Yet notwithſtanding this is to be noted: that it is beſte to take the heigth of the Sunne with the croſſe ſtaffe, when the Sunne is vnder 50. degrees in heigth aboue the Horizon, for two cauſes. The one is this: till the Sunne be. 50. degrees in heigthe the degrees be largely marked vppon the croſſe ſtaffe,

To take ỳ heigth of the Sunne with the croſſe ſtaffe.

The cauſe why the croſſe ſtaffe is beſt to take the heigth of the Sun vnto 50. degrees

but after (the Sunne being aboue. 50. degrées high) they be leſſer marked. The other is, for that the Sunne being vnder 50. degrées in heigth, you may eaſily take the heigth, becauſe you may eaſily ſée or vieuwe the vpper end and the nether end of the croſſtaffe bothe at one time: but if it bothe excéde. 50. degrées, then by the meanes of caſting your eye vpwardes and dounwardes ſo muche, you may ſome commit erroꝛ, and then in like manner the degrees be ſo ſmall marked, that if the Sunne bothe paſſe. 50. oꝛ. 60. degrées in heigth, you muſt leaue the croſſe ſtaffe and vſe the Mariners Ring, called by them the Aſtralaby, which they ought to call the Aſtrolobe.

To take ye heigth of ye Sun with ye Aſtrolobe

Nowe to take the heigth of the Sunne with the common Ring oꝛ Aſtrolobe, doe thus: The Sunne being (as beforé is declared) neare the Meridian oꝛ South, obſerue it (vntill you haue the greateſt heygth thereof) in this manner: Holde the Ring of the Aſtrolobe vpon one of youre fingers, and turne the Alhidada vppe and downe, vntill you ſée the ſhadowe of the Sunne pearſe oꝛ paſſe thoꝛough bothe the ſightes thereof, being ſure that the Aſtrolobe bothe hang vpꝛyght, whiche you may pꝛoue in this manner: Loke at howe many degrées and minutes the Alhidada bothe ſtande vppon the Aſtrolobe, then turne the Alhidada vnto the ſame number of the degrées and minutes on the other ſide of the Aſtrolobe, and then taking the heigth of the Sunne againe, if it doe agrée as it did beforé, then the Aſtrolobe bothe hang vpꝛight: but if it doe not, then it bothe not hang vpꝛight. Foꝛ knowledge of the true heigth of the Sun (the Aſtrolobe not hanging vpꝛight) do thus: if the Aſtrolobe be truely marked, marke the diuerſitie, that being knowne, rebate from the greateſt heigth halfe the diuerſitie, oꝛ elſe adde vnto the leſſer heigth halfe the diuerſitie, and that ſhall be the true heigth of the Sunne, although that the Aſtrolobe doth not hang vpꝛight.

Howe to correct your Aſtrolobe if it bothe noꝛ hang vpꝛight.

The Aſtrolobe is beſt to take the heigth of the Sun, if the Sunne be very high at. 60. 70. oꝛ. 80. degrées, and the cauſe is this:

The Aſtrolobe is beſt

this: the Sunne comming so neere vnto your Zenith, hathe great power of light, for to pearce the .2. sights of the Alhidada of the Astrolabe, and then it is not good to vse the crosse staffe, for that the Sunne hurteth the eyes of a man, and besides that it is to high to occupy the crosse staffe, (as before is declared) so that this way you may very much preserue your eyes. If you haue not glasses vpon your staffe (to saue your eyes in taking the height of the Sunne) but be vnprouided of them, do thus: take and couer the Sunne with the end of the transitorie of the crosse staffe, vnto the very vpper edge or brinke of the Sunne (so shall you not neede to beholde the brightnesse of it) and with the other end of the transitorie to take the horizon truely, and that being done, for that the Sunne is. 30. 02. 31. minuts in diameter or bredth, therefore you shall rebate. 15. minutes from the altitude or heigthe of the Sunne, and then that whiche shall remaine shall be the true heigth of the Sunne from the center or middle of the Sunne. And furthermore there is some error in the taking the Sunne or Starre with the Ballastel or crosse staffe, and that groweth by this meanes: for that the true center (which is the sight of the eye) is within in the middle of the eye, and not in the outside of the eye: so that the end of the long staffe in the setting of it vnto the corner of your eye, bothe standeth somewhat further out than the sight of your eye, that is to saye, that the sighte of the eye is somewhat further into the head, than the ende of the staffe bothe come: wherefore you must pare away a little of the ende of the staffe, for some mens eyes more, and some mens eyes lesse, for that it is according as you may set the staffe vnto your eye, for some méede pare away little or nothing, and some men must pare away. 14. 02. 15. minutes as you may set the staffe: bycause some mens eyes be further into their head than other some mens are, and the bones of some mens face stand further out than other some do. It is moreouer conuenient to know the true meridian, or South, whiche you must do, either with a good

to take the heigth of the Sunne at. 60. 70. or. 80. degrees in heigth.

How to preserue your eyes when you touch the Sunne with the crosse staffe and haue no glasses.

The diameter of the Sunne is 30. 02. 31. minuts.

Some error in the crosse staffe and how to reforme it.

To get the true Meridian vpon the Land.

good compasse or with a perfyte diall or Nedel: but if you be on the land this you may do: on a perce of timber, or any other thing that standeth fast, with a paire of compasses make a circle, then in the midle or center where the fote of the compasse did stand set a wire vpright (as circumspectly as you can) and then you may do this: loke in the morning (so it be on plaine ground that you may see the horizon circle, without any let) at the Sunne rising, for the shadow of the wier, and there set a pricke: then at the setting of the Sunne you shall set another pricke, euen at the circumference of the circle, then deuide that with your compasses euen in. 2. peces, and strike a straight line from the wier or center of the circle, to the middle or deuided prick, & that shal be true meridian. Or else (the wier standing vpright) first in the fore noone when the top of the wier doth touch, or is ready to come into the circumference or edge of the circle, there make a pricke: then in the after noone in like manner, at the very comming out or touching of the wyer, of the edge of the circle, there make an other pricke euen with the comming out of the shadow: this done (as circumspectly as you can) deuide these 2. prickes in the midle, then as before is said, drawe a line frō the center or wier, to the midle pricke, and that shadow shal be your true meridian. After another manner you may doe this: loke and watch when the wyer giueth the shortest shadowe, and there make a pricke: then draw a line from that prick to the wyer, which shadow shall be the true meridian.

To knowe the true Meridian at the Sea, and also (if your compas be varied) and to know how much they be varied.

And yet furthermore, for ỳ it is most cōuenient to know ỳ true Meridian at the Sea, because in long viages going far vnto the Westward or Eastward, the compasse doth varie: to find the true Meridian do this. Set the Sunne with your compasse at his rising or appearing aboue ỳ horizon, & then (knowing what point & part the Sunne doth rise at) set the Sun with your compas at his setting or departing vnder ỳ horizō, & (that being known) you shal perfitly know, whether the compas be varied, & how much: for ensample this, I doe

set

set the Sun at hir rising with the compas, & she doth rise vpō the East point: in like maner also I do set the Sun with hir compas at hir setting, & do find hir to set West Northwest: so I do see the compas to be varied one point, that is to say, the North point doth stand North and by East. &c. And furthermore (for that seldome times the Sun dothe rise and set cleere by the meanes of the clowdes, and other impediments neere the horizon) you may get the true Meridian thus: at any time in the fore noone, first set the Sunne with your compas, and then take the true heigth of the Sunne. Now you (knowing how many degrees ẏ Sun was high at that point of the compas) may in like maner obserue the Sunne in the afternoone, vntill you do find the Sun iust at that heigth that it was in the forenoone, marking at what point of the compas the Sunne is, and so shall you see perfitely whether the compas be varied or no, and also howe much: for ensample thus: I take the Sun vpon the Southest poynt. 20. degrees aboue the horizon, & then in the after noone I do obserue the Sun vntil such time as I do find the Sunne iust. 20. degrees aboue the horizon again, & then I set ẏ Sun with the compas and do find ẏ Sun to be at. 20. degrees in heigth west Southwest, so that I see ẏ compas to be varied one point, ẏ is to say the North point doth stand North & by East. &c. Another way also to know ẏ true meridian, is by the Sun: that is, to set ẏ Sun with ẏ cōpas at hir greatest heigth aboue the horizon, & so you shall know whither ẏ cōpas be varied, & how much: & like what is spoke of ẏ Sun by day, you may do the like by night by any of the Starres ẏ you perfectly do know, doing as you do by ẏ Sun in all points: but you cannot do it so well and truly by the Moone, by the meanes of the swiftnesse of ẏ moones motiō in the Zodiack, you may also find the variatiō of ẏ cōpas by the North Starre, as thus: set ẏ North Star with the compas, if the North point do stande right with the Starre, then it is not varied, but if it dothe not stande ryghte wyth the Starre, then it is varied: and that must

To find the variation of the compas in the night by ẏ Starres: but not by the Moone.

be

be done when the.2.Starres of Charles Waine called the pointes be right vnder,or right ouer the North Star, but if that the Starres be West from the North Starre,then the North Starre is the third part of a point vnto the Eastward of the North pole. If the. 2. Starres of Charles Wayne called the poynters be due east from the North Starre, then the North Starre is the third part of a point vnto the westwarde of the North pole.&c. This haue I saide bycause that sometime in sundry places,the compasse doth varie,& especially in the saying of long viages running East and West, (called the Northeasting or Northwesting of the compasse) therefore I would not wish them to meddle with the mending of their compasse or whetting of the side of the nedell to the end to make it to stand due North,but circumspectly to awaite the altering of the compasse, and what quantitie it doth alter:as you may do very well, by the order before rehersed,and then let your compasse alone:for although that it dothe varie.2.or.3.poynts,you may make account according to the variation as thus:I admit the Northwest point standeth due North,and my course is to go due West,I will occupy the Southwest pointe in this case for the west poynte. And thus(by obseruation and trying of my compasse) I care not what point standeth due North, for it is all one,so that you consider what poynt standeth North. And now furthermore,some are of that opinion,that(by the Northeasting or Northwesting of the compasse) you may knowe the Longitude:but I am not of that opinion, for I admit that it be so (as some do affirme)that the compasse doth varie, (as some haue said)that is, that you being.90.degrees vnto the Westwarde (from the place youre compasse was made at)youre North poynt should stand Northeast:and in like maner you being.90.degrees East,your North poynt should stand Northwest:then by that order the compasse should vary one poynt at.11.degrees and a halfe, and that commeth vnto.450.English leagues(if you be neare vnto the equinoctial:)wherefore

Medell not with your compasse although it be varied.

To saile by the compas that is varied.

As touching Longitude to be found by the Northeasting or Northwesting of the compasse.

no

no maſter or pilotte of a ſhippe, doth kepe ſo ſimple account of the ſhippes way, but that he may knowe what diſtaunce he hath vnto any place better than he ſhal know by the vari-ing of the compas: & alſo whether it be ſo or not ỳ the cõpas doth kæpe any ſuch proportion in the variatiõ, I do refer that vnto them that haue tried the experience therof: for I for my part can ſay nothing in that matter. Wherfore I ceaſe from writing muche therof, although the Sea men be very deſirous to haue ſome way to get the Longitude. But if it be true that the compaſſe doth varie by that proportion, then it were very good for them to practiſe that matter that ſhoulde make any diſcouery vnto the Northwardes, for that the degrees be ſo ſhort in thoſe Paralels.

## The ſeuenth Chapter ſheweth how to handle the declination of the Sunne, to knowe the altitude of the North pole aboue the horizon, (the heigth of the Sunne being truely taken and knowen in any place betweene the North pole and the Equinoctiall) ſo that the Sunne be vnto the Southwards of you, at the taking of the Sunne vpon the Meridian.

YOu muſt conſider by the regiment or table of declination (going before) that the.11. day of Marche the Sunne is equinoctiall entring then the firſte point of Aries (called the equinoctiall of ſpring time) where he hath no declination. The.10. day of Aprill the Sunne entreth into the firſte minute of Taurus, then hauing declination to the Northwards. 11. degrees. 30. minuts. The.12. day of May, the Sunne entreth the firſt poynte of Gemini, hauing then declination. 20. degrees. 12. minuts. The.12. day of June the Sunne entreth into Cancer, where he (making his greateſt progreſſe to the

The greateſt declination of the Sunne.

Northwards) hath. 23. degrées. 28. minuts of declination. But now in this our time, some do affirme it to be. 23. degrées and a halfe, but it lacketh. 2. minuts. The. 14. day of Julie, the Sunne entreth into Leo comming downwards to the Equinoctiall, hauing. 20. degrées. 12. minutes of declination. The 14. day of August the Sunne entreth into Virgo, hauing declination. 11. degrées. 30. minutes. The. 14. of September, the Sunne entreth into Libra, (then being Equinoctiall, and hauing no declination) whiche is called the Equinoctiall of Autumne or harueſt, where he beginneth his South declination. The. 14. of October the Sun entreth into Scorpio, where his declination is. 11. degrées. 30. minutes. The. 12. of Nouember the Sun entreth into Sagittarius, his declination being. 20. degrées. 12. minutes. The. 12. day of December, the Sunne entreth the firſte minute of Capricorne, where the Sunne (making greateſt progreſſe to the Southwards) hath of declination. 23. degrées and. 28 minutes. From whence he retourneth to the equinoctiall againe. The. 11. of Januarye the Sunne entreth into Aquarius, where his declination is 20. degrées. 12. minutes. The 10. day of Februarye the Sunne entreth into the firſt minute of Piſces, and hath of declination. 11. degrées. 30. minutes. The. 11. day of March, the Sunne retourneth to the ſelfe ſame place that it departed from before, wherefore the Egyptians did paint the yeare like to an adder biting his tayle, and (not hauing the vſe of letters) they made a ring and named it *annulus*, as it were *annus*, that is to ſaye a yeare: bycauſe a ring dothe turne rounde in it ſelfe as dothe the yeare. The heigth of the Sunne being knowen, you (knowing the day of the moneth, and what yeare it is after the *Biſſextile*) muſt turne to the day of the moneth, in the regiment or table going before, where right againſte the day of the moneth you ſhall find the degrées of declination and the odde minuts belonging to the degrées of declination following: that being knowen (that is to ſay, the heigth of the Sun with the degrees and minutes of the declination)

Equinoctiall of Autumne.

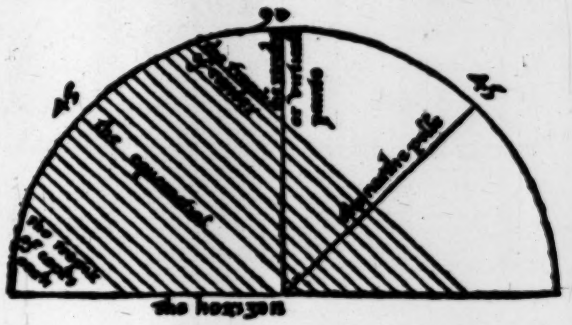
The greateſt declination to the South.

The yeare is compared vnto a ring or an adder biting his tayle.

nation) if the Sunne haue North declination, you shall subtract or take away the Sunnes declination from the heigth of the Sunne, with the degrees and minutes: and then that which remaineth shall be the true heigth of the Equinoctiall: whiche being knowen, pulling that sume out of .90. with the degrees and minuts, that whiche dothe remaine shall be the true heigth of the North pole aboue the horizon. But if that the Sunne hathe South declination, you shall adde or put that declination vnto the heigth of the Sunne, whiche shall shewe vnto you the true heigth of the Equinoctiall: of the which sume (being taken from .90.) that which doth remain shall be the altitude of the North pole aboue the horizon. For this is to be noted: loke what heigth the Equinoctiall is aboue the horizon, it is equall or iust so much betweene the Zenith or verticall point and the North pole. In like maner: loke how many degrees and minutes are betweene the Equinoctiall and your Zenith, iust that number of degrees and minuts is from the North pole, downe to the horizon, which is the cause that you must pull the heigth of the Equinoctial, from the horizon with the degrees and minutes. For that your Zenith is alwayes .90. degrees from the horizon as you see by this figure.

The heigth of the Sun being taken and knowē then how to handle the declinatiō to know the heigth of the pole.

Things to be noted as touching the taking of the altitude of the pole.




B.ij. The

# The .8. Chapter sheweth you how to handle the declination of the Sunne, when you are betweene the Equinoctiall and the Sunne: that is to say, the Sunne being to the Southwards or Northwards of you and the Equinoctial, or vnder the Equinoctiall: the heigth of the Sunne being truely knowen or taken.

NOw furthermore if you be vnto the South parts neare vnto the equinoctiall, so that the Sunne haue any great declination either to the Southwards or ẏ Northwards, you bring betweene the equinoctial and the Sunne, whē you haue taken the true heigth of the Sun with ẏ Astrolobe, to know the heigth of any of the .2. poles do this: seeke the declination of the Sun for that day with the degrees & minuts, the declinatiō being knowen & the heigth of the Sunne in like maner, then adde ẏ declinatiō of the Sun vnto the heigth thereof, & it will exceede or be more than .90. degrees, then againe looke how many degrees it is more thā .90. with degrees & minuts, that shal be the true heigth of the pole towards that side that the Sun is: bycause ẏ Equinoctial is ẏ number of degrees aboue .90. (which is your Zenith) to the contrary part frō the Sunwards. For (as I haue said in ẏ chapter going before & is general for euer) looke what heigth soeuer ẏ Equinoctial be frō ẏ horizō, that is the true distance betweene ẏ Zenith and the pole: in like maner looke what distance is betweene the Equinoctial & the Zenith, ẏ same is the true distāce between the horizon & the pole, that is to say, the pole is so many degrees in altitude aboue ẏ horizō. As it is a cōmon saying (in knowing how farre we be vnto the Southwards or Northwards) ẏ the pole artick is so many degrees in altitude, or (as som wil say) that we are in so many degrees in Latitude: the question is all one in effect, although the one be called Altitude or heigthe, and the other Latitude or wideneſſe, yet it hathe one signification: for as when you say altitude or heigth.

A thing to be noted.

Altitude or Latitude is all one question in effect.

heigth of the Pole, you meane the Pole is rayſed ſo many degrees aboue the Horizon. So likewiſe when you ſay Latitude, you mean you be ſo many degrees in wideneſſe frō the Equinoctiall: for that your Zenith or verticall pointe is ſo many degrees frō the Equinoct. Moreouer if you chaunce to be right vnder ỹ Equinoctial, as you cānot ſay that you haue any Latitude, ſo likewiſe cannot you ſay that you haue any Altitude, for that the two Poles be then iuſt with your Horizon, and in like maner the Equinoctiall is your Zenith or Verticall poynte. But when you will take the heigth of the Sunne with your Aſtrolobe, then loke what declination the Sunne hath, either to the Southwardes or Northwardes. Then put the declination of the Sunne vnto the heigthe of the ſame, and the number will be iuſt. 90. degrées: if it lacketh any thing of. 90. degrées, then it ſignifieth that the Equinoctiall lacketh ſo much of the Zenith, and ſo muche iuſt ſhal the pole be aboue ỹ Horizon towards that part that you be in from the Sunne wardes. But contrarywiſe, if it dothe exceede or be any thing more than. 90. degrées, then (as afore is declared) it ſignifieth that the Equinoctiall is as much as that number (both in degrées and minutes.) On the contrary ſide, from the Sunne wardes, that is to ſay, your Zenithe ſhal be betweene the Sunne and the Equinoctial, & the Pole ſhall be ſo many degrees or minutes aboue the Horizon, as is the diſtaunce betweene the Zenith and the Equinoctiall, towardes that part or ſide that the Sunne is on. Wherefore I do think it neceſſarie to giue certaine enſamples (and firſt take this for an enſample.) Admit I doe take the heigth of the Sunne vnto the North wards. 80. degrées aboue the Horizon, and the Sunne hathe declination vnto the Northwardes. 20. degrées, to which I adde or put the heigth, that is to ſay. 80. degrées (being the heigth of the Sunne) and. 20. degrées (being the declination of the Sunne) doe make. 100. frō which I pull. 90. away (which is my Zenith) and ſo ther remayneth. 10. degrées. Wherefore you may conclude that the

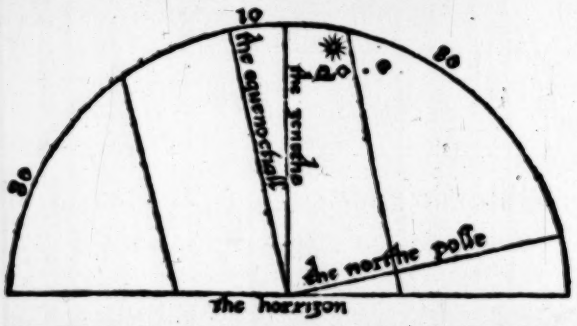
Being vnder the Equinoctiall you haue neither Latitude nor Altitude, for that the Equinoctiall is your Zenith and the Poles your Horizon.

Of your Zenith being betweene ỹ Equinoctiall and the Sunne.

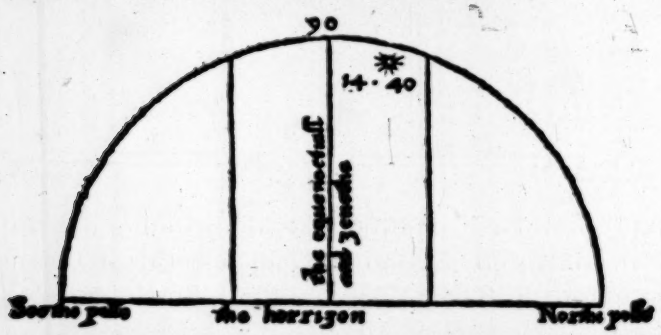
In enſample.

An enſāple where the pole is. 10. degrees aboue the Horizon.

Equinoctiall is. 10. degrees to the South parte of youre Zenith, and the Sunne to be. 10. degrees to the North parte of your Zenith, ſo that the North Pole is. 10. degrees aboue the Horizon, as by this example it is declared.

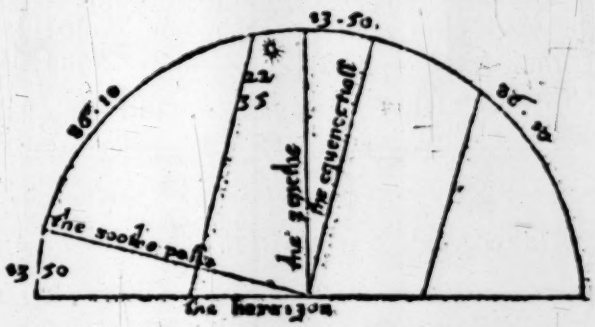



And for the ſecond enſample, admit I take the Sunne vnto the Northwardes. 75. degrees and. 20. minutes aboue the Horizon, the Sunne haning North declination. 14. degrees 40. minutes, I then do adde or put. 14. degrees. 40. minutes vnto. 75. degrees. 20. minuts, and thoſe. 2. ioyned togither maketh. 90. degrees, wherof you may conclude that the Equinoctiall is your Zenith, and then the. 2. Poles be with your Horizon, as by this example it doth appeare.




And now followeth the. 3. enſample. I admit the Sunne be taken with the Aſtrolobe. 81. degrees and. 15. minutes aboue the horizon, and the ſame hathe South declination. 22. degrees.

degrées.35.minutes, wherefore I do adde or put togither.8. degrées and.15.minutes (being the heigth of the Sunne) and 22.degrees.35.minutes (being the declination) and that maketh.103.degrees.50.minutes: from which I take away.90. degrees (which is my Zenith) so that there remayneth.13.degrees.50.minutes: so that you may safely conclude that the Equinoctiall is.13.degrees.50.minutes vnto the Northparts of the Zenith, and then it must nedes follow that the South pole is.13.degrees.50.minuts aboue the Horizon, as by this ensample it is declared. In ensaple.



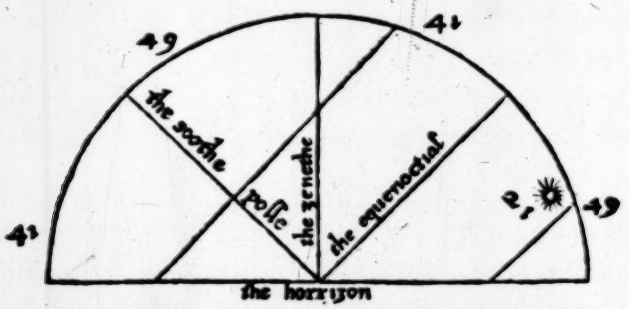

# The nynth Chapter sheweth how to handle the declination of the Sunne, vvhen you are beyond the Equinoctiall, that is to say, betweene the South pole and the Equinoctiall: with certaine ensamples both for the South pole and the North pole.

And furthermore if you be vnto ẏ Southwards beyond ẏ Equinoctial, as betwéen ẏ tropick of Capricorne & ẏ South pole, then to vse the declination of ẏ Sun to know ẏ heigth of the South pole or antartick pole by the heigth of the Sun, ther s

To take ẏ Sun to the Northwardes you being betweene the south Pole and the Equinoctiall.

there is no other matter in the doing thereof, but wheras we (being vnto the North partes) do adde the South declination vnto the heigth of the Sunne, and rebate the North declination from the heigth of the Sunne, so in like manner the contrary is to be vsed: that is to say, to rebate the South declination from the heigth of the Sunne, and to adde vnto the heigth of the Sun the North declination. As for ensample. I admit the heigth of the sun be taken. 28. degrees aboue ẏ Horizon due North, & the declination of the Sun be. 21. degrees vnto the Northwards, I do thē adde the declination of ẏ sun which is. 21 degrees vnto the heigth of the Sun (being. 28. degrees) which maketh. 49. degrees, & so many degrees ẏ Equinoct. is aboue the Horizon vnto the Northwards, & then (as it is before declared) pull that sum out from. 90. degrees, and there remaineth. 41. degrees, which is the distance betweene the Zenith and the Equinoctiall, whiche alwayes is equall with the distance betweene the Pole and the Horizon: so that you may conclude the South Pole to be raysed. 41. degrees aboue the Horizon. As by this figure it is shewed.

An ensāple by taking ẏ South pole 41. degrees aboue the Horizon.

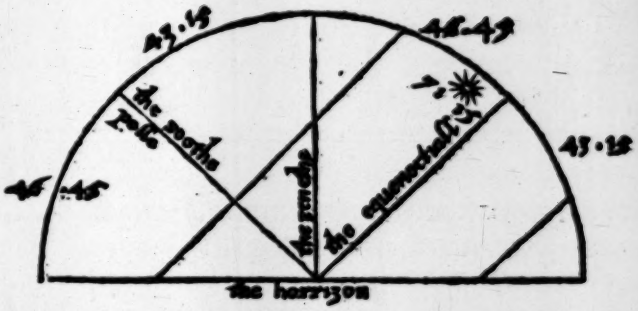



And furthermore, if the Sunne haue South declination, then (as before is declared) you must subtract or take away the Sunnes declination from the heigth of the Sunne: as for ensample. The heigth of the Sunne being taken at. 50. degrees. 30. minutes vnto the North partes, and the Sunne

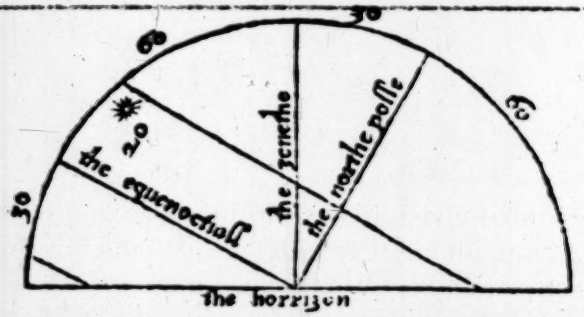
hauing

hauing. 7. degrées and. 15. minutes of declination vnto the ſouthwards, from which heigth of the Sun (for that you are vnto the the Southwards beyond the Equinoctial) you muſt rebate the declination which is. 7. degrées and. 15. minuts, and there reſteth. 43. degrées. 15 minuts, for the true heigth of the Equinoctial, which ſumme you muſt take out of. 90. degrées, that done, there remayneth. 46. degrées. 45. minutes, the true heigth of the South Pole aboue the Horizon, otherwiſe called the Antarticke Pole, as by enſample of this Fygure is playnely ſhewed.

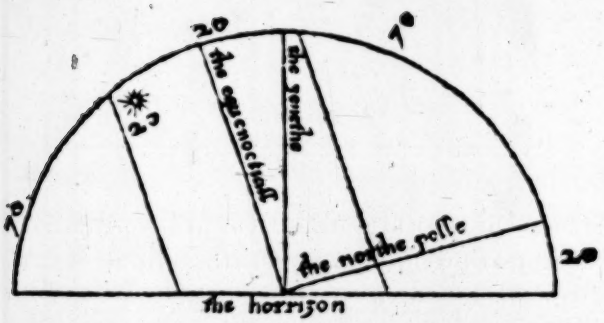
An enſample by taking ye north pole 60. degrees aboue the horizon.




Yet furthermore I do thinke it conuenient to giue you an enſample vnto the Northwardes, that you maye perfectly knowe the true order of the worcking, bothe for the North parte and alſo the South parte. Admit therefore I take the heigth of the Sunne due South, at. 50. degrées aboue the Horizon, the Sunne hauing then north declination. 20. degrées: Now (for as much as you haue the north Pole aboue the horizon) you muſt rebate the Suns declination frō the heigth: ſo that. 20. degr. being taken away from. 50. there reſteth. 30. whiche is the heigth of the Equinoctiall aboue the Horizon, and that. 30. being taken from. 90. there reſteth. 60. So that you maye boldly affirme the North Pole to be. 60. degrées aboue the Horizon, as by this figure folowing it is ſhewed.




In like maner the Sunne being taken at that heigth and due South, hauing the like declination also to the Southwardes that it had before to the Northwardes: that is to say, being. 50. degrées in heigth, and hauing. 20. degrées of declination vnto the South partes, you muste adde or put the declination of the Sunne vnto the heigth of the same, and it maketh. 70. degrées which is the heigth of the Equinoctiall aboue the Horizon, this done, that. 70. being taken out of. 90. there remayneth but. 20. so that the North Pole is but. 20. degrées aboue the Horizon, as by the ensample of this figure it is shewed.




For in handling of the declination the true heigth of any of the Poles is knowne. Alwayes hauyng this consideration, that if they haue the North Pole aboue the Horizon, they do alwayes

alwayes adde or put to the heigth of the Sun, the South declination of the same. Or the Sunne hauing North declination, they pul away the Sunnes declination from the heigth thereof. Nowe contrarywise, if the South Pole be aboue the Horizon, you muste adde the North declination vnto the heigth of the Sunne, and take away the South declination from the heigth of the same. Nowe to knowe whiche of the 2. Poles be aboue the Horizon, is a very easie matter and is knowne. 2. wayes. For firste if the North Pole be aboue the Horizon, you may knowe it by all the Starres rounde about the Pole, as Charles Wayne and the Guardes, with such other markes as be aboute the North Pole. Neyther can you passe so sodenly beyond the Equinoctiall, but it must needs be known vnto you, & then you must vse that kynd of worcking with the Sunnes declination that in the chapter or rule before is rehearsed: and also you may knowe it by the Arke or bearing of the Starres and lyghtes rounde aboute you. Thus much haue I sayd as touching the Suns declination, bycause I knowe that diuers English men would haue trauelled further beyonde the Equinoctiall than they haue done, but that they haue not had the capacitie to handle the Sunnes declination when they haue bene beyonde the Equinoctiall, that is to say, vnto the South partes, hauing lost the markes about the North Pole as the North Starre and other, and as for the Stars of the South, they haue not bene acquainted with them, but haue beaten vp and downe alongst the coast of Guinie and Bynney, and there haue spoiled and consumed their men through the extraordinarie heat of the Sunne, not knowing that in going further to the South partes, they shoulde haue brought themselues into a good temperate clymate againe.

A thing to be noted in handling of the Sunes declination.

Howe to know whiche of the. 2. poles be vnder the horizon.

The cause why englishmē haue not trauelled far beyonde the Equinoctiall.

An intemperat place for extreme heate.

Temperate clymate.

## ¶ The. 10. Chapter sheweth, howe to handle the Sunnes declination vnto the Northvvards, where the Sunne doth not set vnder the Horizon, and also to take the Sunne at the lowest being due North.

Of being vnder either of ỹ poles.

Of taking the heigthof the sun due north at the lowest.

A thing worthy to be noted as touching ỹ sunnes declination.

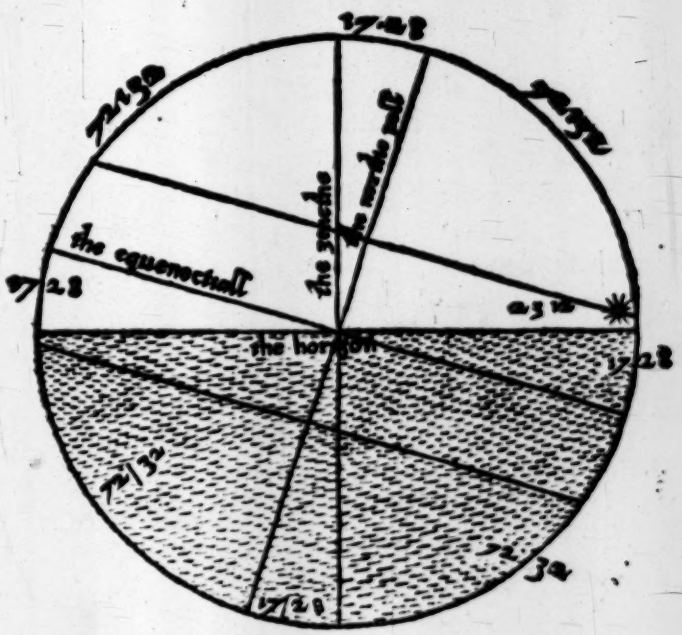
FOr further vse of the Sunnes declination, if you haue any occasion to trauell vnto the Northwardes or Southwardes more than. 67. degrees of Altitude of any of the. 2. Poles, or if the sunne haue any great declination vnto those parties that you are in, thē shall not the Sun go down vnder the Horizon in a long time, after as you be in distance vnto the North parts, for if you were right vnder either of the. 2. Poles of the world, then would not the Sunne go vnder the Horizon in halfe a yeare, so that there should be continually day: And now for the handling of the Sunnes declination, to knowe ỹ heigth of the Pole, & to take the Sun North at the lowest, do this: First with your croſſe ſtaffe obſerue the Sun at the lowest, taking the true distance betweene the Horizon and the Sunne, that being truely done, loke what declination the Sunne hath, then haue you to consider, that except the Sunne be neare vnto hir greatest declination, that is to say, in the latter end of Gemini, or the beginning of Cancer) the Sunne dothe decline little in. 24. houres: but if the declination be very swift, you must seeke the Sunnes declination vpon the day before, and the daye after, halfe the diuersitie of whych shall be the Sunnes declination: for that the sunne is at the angle of mydnight. The Sunnes true declination being knowne, rebate the heigth of the same from the declination of the Sunne, & so shal you haue the true contente in degrees and minuts that the Equinoctiall is vnder the Horizon due North, and then pulling that sum from. 90. that which remaineth shal be the heigth of the pole aboue the Horizon: for (as it is before declared) loke what heigth the Equinoctial is aboue the Horizon, that is equal the distance betweene the Pole and the Zenith, and loke what distance

is be-

is betweene the Equinoctiall and the Zenith, the same distaunce is betweene the Pole and the Horizon in like manner, loke howe deepe vnder the Horizon the Equinoctiall is vnto the Northwards, so far equall is the heigth of the Equinoctial vnto the southwards. As for ensample: admit I were vnto ỹ Northwards of the North cape, the Sun bring in hir greatest declination vnto the Northwards, whiche is about the.11.day of June. 23.degrees and neere a halfe this being knowen I take the Sunne due North at the lowest, iust.6.degrees aboue the Horizon. the declination being.23. degrees and.28.minutes. Wherefore I rebate from that.6. degrees and so there remayneth.17.degrees and.28 minutes. For the depth of the Equinoctiall vnder the Horizon, and then do I pull that summe from.90.and there remayneth 72.degrees.32.minutes for the true heigth of the North pole aboue the Horizon, as by this ensample it is declared.

A thing to be noted of the pole and the Equinoctiall, the Zenith and the Horizon

The Sun taken due North at.6 degrees.




I.iij.

By this ensample you may also know the true heigth of any of the .2. poles, and how to obserue the Sunne at the lowest when the Sunne commeth nereſt vnto the Horizon, as well as you may when the Sunne is vpon the Meridian at the greateſt heigth from the Horizon, which is very neceſſary for them that do occupy vnto the Northwardes of Saint Nicholas in Rouſey, it is also very neceſſary for them that would attempt any viages of diſcouery vnto the Northwards, as into the Eaſt by Noua Zemla, or to the Weſt by cape de Paramantia, on the backe ſide of the North part of the tayle of America, other wiſe called the backe ſide of Vacula, whiche if it were attempted, there is no doubt but they ſhoulde finde it nauigable eyther to the Eaſt parte or to the Weſt part: and I am of this opinion, that the thing moſte feared in making their diſcouery vnto the Northward, deſerueth not ſo greatly to be feared as they do make it, the cauſe why they are ſo loth to go very farre vnto the Northwards is, for that it is the froſen zone, but my opinion is, that in ſommer tyme it is not to be feared, but the further vnto the Northwardes the more temperate warme, by meanes of the long continuaunce of the Sunne: for as we ſee by common experience that a thing once being made warme cannot ſodenly be made cold, neither is there doubt of any great cold vntill the Sunne be vnto the Southwards of the Equinoctiall: for I admit that a ſhip ſhould ſayle vnto the Northward, and not ſtay vntill the North pole were eleuated .80. degrees aboue the Horizon, I do thinke then they ſhould find it very temperate and warme vnto the midle of September, for that by the ſpace of .9. weekes together (that is to ſay from the .10 day of May, vnto the 12. day of July) the Sun ſhould come no nerer vnto the Horizon due North than .10. degrees, or .30. degrees vnto the South part aboue the Horizon: and yet it is poſſible that it may be cold there vntill the ende of May, for that the Sunne muſt haue a time to make the aire warme. For like as a thing once being

Of viages for diſcouery to the Northwards eyther to the Eaſtward by Noua Zemla or to the Weſtward by cape de Paramantia.

Of temperateneſſe the pole being rayſed 80. degrees

cold

colde cannot bee ſodaynely made warme, ſo in like manner a place being once made warme cannot bee ſodainely made colde. And furthermoze he that were in the Latitude of. 80. degrees ſhoulde haue but a ſhoꝛt paralele: foꝛ the whole compaſſe of the earth and Sea going Eaſt and Weſt to come rounde about to that place agayne in the ſame paralele is but. 1250. engliſh leagues, euery league conteining. 3. engliſhe miles: So that in ſayling of leſſe than 500. oꝛ. 600. leagues, they myght ſee whether it were nauigable oꝛ not.

The length of the paralele at. 80. degrees is but. 1250. engliſh leagues.

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# The eleuenth Chapter doth ſhew hovv you ſhall knovve the length of the day, and to knowe how much the day is ſhortened or lengthened by the Sunnes declination.

NOwe I thinke it conuenient foꝛ Seafaring men to knoiwe the length of the daye in anye place that they haue occaſion to go vnto: foꝛ that they haue occaſion to trauell into all the climates and places, tranſpoꝛting them ſelues manye tymes quickly from one place vnto another: and although the auncient wꝛiters haue appoynted certayne climates, and other late wꝛiters in lyke manner haue made tables very exact foꝛ the longeſt oꝛ ſhoꝛteſt day in anye of thoſe climates, and other places, accoꝛding to the elevation of the pole: yet haue they not opened anye waye vnto them in gyuing anye oꝛder foꝛ them to knoiwe when the days is an houre longer

longer or shorter, whereby they might at all times knowe the length of the day, which notwithstanding is very necessary for them, for that they be abroade vnder sayle bothe night and day, and in like manner for that they must keepe account of houres and times exactly, in as muche as they ought to keepe an account of the shippes way: wherefore it must needes be most necessary for nauigation, to knowe the true time of the Sunne rising and setting, whiche you shall knowe by this meanes: first this is not vnknowne, that vnder the Equinoctiall the Sunne is. 12. houres aboue the Horizon, and. 12. houres vnder the Horizon, (what declination soeuer the Sunne hath) so that there the Sunne ryseth at. 6. of the clocke and setteth at. 6. of the clocke for euer. And where the pole is raysed. 16. degrees and. 44. minutes, there the longest day is. 13. houres, (the Sunne hauing hir greatest declination at. 23. degrees. 28. minutes) and the shortest day is 11. houres long: and then loke when the Sunne hath declined. 23. degrees and a halfe eyther backwards or forwardes, for then the day is an houre longer or shorter and proportionably: when the Sunne hath declined. 11. degrees. 44. minutes then it is halfe an houre longer or shorter. &c. Moreouer wher the pole is eleuated. 30. degrees. 48. minutes, there the longest day is. 14. houres and the shortest day is. 10. houres long, the Sunne then rising at. 5. of the clocke and setting at. 7. of the clocke, and there when the Sunne hath declined. 11. degrees and. 44. minutes from the Equinoctiall. &c. vnto the greatest declination, then the day is an houre longer or shorter, and whe the Sunne hath declined. 5. degrees. 52. minutes then the day is halfe an houre longer or shorter. &c. Furthermore also, where the pole is raised. 41. degrees. 23. minutes, there the longest day is. 15. houres, and the shortest. 9. houres long, (the Sunne hauing hir greatest declination, and as the rising at. 4. of the clocke. 30. minutes, and setting at. 7. of the clocke. 30. minutes) so that there when the Sunne hath declined. 7. degrees. 49. minutes from the Equinoctiall, the day shall

How necessary it is for a Seafaring man to know the legth of the day.

Vnder the Equinoctiall the day is always. 12. houres log.

The pole 16. degrees 44. minutes the day. 13. houres long when it is at the lõgest.

The pole 30. degrees 48. minutes the longest day. 14. houres log.

The pole 41. degrees 23. minutes the longest day. 15. houres log.

shall be an houre longer or shorter, and when it hath declined 3. degrees. 54. minutes, the day shall be halfe an houre longer or shorter. &c. And furthermore, where the Pole is rayſed. 49 degrees one minute, there the longeſt day is. 16. houres, and the shortest. 8. houres long, the Sunne rysing at. 4. of the clocke, and setting at. 8. of the clocke, so that there when the Sunne hath declyned. 5. degrees. 52. minutes from the Equinoctiall, then shall the daye be an houre longer or shorter. And when the Sunne hath declyned. 2. degrees. 56. minutes, then the daye shall be halfe an houre longer or shorter. &c. Yet furthermore, where the Pole is rayſed. 54. degrees. 30. minutes, there the longeſt day is. 17. houres, and the shortest 7. houres long, the Sunne then rysing at. 3. of the clocke 30. minutes, and setting at. 8. and. 30. minutes: where when the Sun hath declyned. 4. degrees. 41. minutes from the Equinoctial, to the greateſt declynatiõ, the day is an hour longer or shorter, and when she hath declined. 2. degrees. 21. minuts, the day is halfe an houre longer or shorter. &c. Where also the Pole is rayſed. 58. degrees. 27. minutes, there the longeſt day is 18. houres long, and the shortest but. 6. and there when the Sunne hath declined. 3. degrees. 55. minuts from the equinoctiall, then the day shall be an hour longer or shorter: and when the Sunne hath declyned. 2. degrees lacking. 2. minuts, then the day shall be halfe an houre longer or shorter. Furthermore also, wher the pole is raiſed. 61. degrees. 18. minuts, there the longeſt day is. 19. houres long, and the shortest but. 5 houres: then shall the Sunne ryse at. 2. of the clocke. 30. minutes, and set at. 9. and. 30. minutes, and there when the Sun hath declined. 3 degrees and. 21 minutes from the Equinoctiall, then shall the daye be an houre longer or shorter. &c. Furthermore, where the Pole is rayſed. 63. degrees. 22. minutes, there the longeſt daye is. 20. houres long, and the shortest but. 4. houres, then shall the Sunne ryse at two of the clocke, and sette at tenne of the clocke, and when the Sunne hath declyned two degrees, and fiftie sixe minutes

The pole raiſed. 49. deg. 1. mi. then the longeſt day is 16. houres long.

The pole raiſed. 54. deg. 30. mi. then the longeſt daye is 17. houres long.

The pole rayſed. 58. deg. 27. mi. the longeſt day is. 18. houres long

The pole rayſed. 61. deg. 18. mi. the longeſt day is. 19. houres long

The Pole 63. deg. 22. mi. the longeſt day. 20. hours long.

from the Equinoctiall vnto the greateſt declination, then ſhall the day be an houre longer or ſhorter &c. Now where the pole is rayſed.64.degrées. 49.minutes, there the longeſt day ſhall be. 21. houres long, and the ſhorteſt but.3.houres: And there when the Sun hath declined but.2.degrees.36.minutes from the Equinoctiall vnto the greateſt declination, the day ſhall be an houre longer or ſhorter. Where alſo the pole is raiſed.65.degrées, there the longeſt day ſhall be.22. houres and the ſhorteſt but .2. houres long, and when that the Sunne hath declyned but.2.degrées and.20.minutes from the Equinoctiall &c. then the day ſhall be an houre longer or ſhorter. &c. And where the pole is rayſed. 66. degrées.20.minutes the longeſt day ſhall be.23.houres long and the ſhorteſt but one houre long, and then when that the Sunne hath declined but.2.degrées.8.minutes, then the day ſhall be an houre longer or ſhorter, and then where that the North pole is rayſed.66.degrées and.32.minutes, there it is 24.houres long, for that when the Sunne hath hir greateſt declination vnto the Northwardes, then at midnight you ſhall ſée halfe the Sunne, and then when that the Sun hathe the greateſt declination vnto the South parts, then you ſhal ſée but halfe the Sunne at noone, and then in the going but 15.miles further vnto the Northwards, that is, but one quarter of a degrée, then the Sunne ſhall be cleane aboue the Horizõ at the due North, and not ſéene vnto the South at noone aboue the Horizon, the Sunne hauing hir greateſt declination to the South, and then the day ſhal be an hour longer or ſhorter when that the Sunne hath declined one degrée.57 minutes from the Equinoctiall and ſo forth vnto the greateſt declination. And thus much haue I ſayd as touching the length of the daye, whereby you maye knowe at all times the true length of the day in any Latitude betweene the Equinoctiall and the elevation of the pole at.66.degrées and 32.minutes, by knowing howe manye degrées the Sunne is declined, and that you may know on euery day by the regiment

The pole rayſed.64. degrees.49 minutes the longeſt day 21.houres long.

The pole 65. degrees the longeſt day.22. houres lõg.

The pole 66.degrees 20.minutes the longeſt day.23. houres lõg.

The pole 66.degrees 32.minutes then the Sun ſhall not ſet vnto them.

The Sun clean aboue the Horizon due North and not to appeare aboue the Horizon South at noone.

giment going before, hauing this consideration, that if the Sunne being vppon the Equinoctiall, and hauing no declination, that then in anye Latitude the daye is alwayes iust. 12. houres long. And you must note this, that it is called the day from the rising of the Sunne vnto the setting of the same vnder the Horizon and not from day light vnto day light. For before the Sun rise and after that the Sun is set it is counted for no parcell of the day but it is called the day light. And furthermore, the day light will appeare by that time that the Sunne doth touch the. 17 degree of the Horizon before the Sunne rising, and also the day light will not be cleane gone vntill the Sunne be more than. 17. degrees vnder the Horizon: for as you may perceiue here with vs at London that when the Sunne hath his greatest declination vnto the Northwards in June that the day light remaineth all night, for that the Sunne goeth not vnder the Horizon, but. 15. degrees and. 2. minutes.

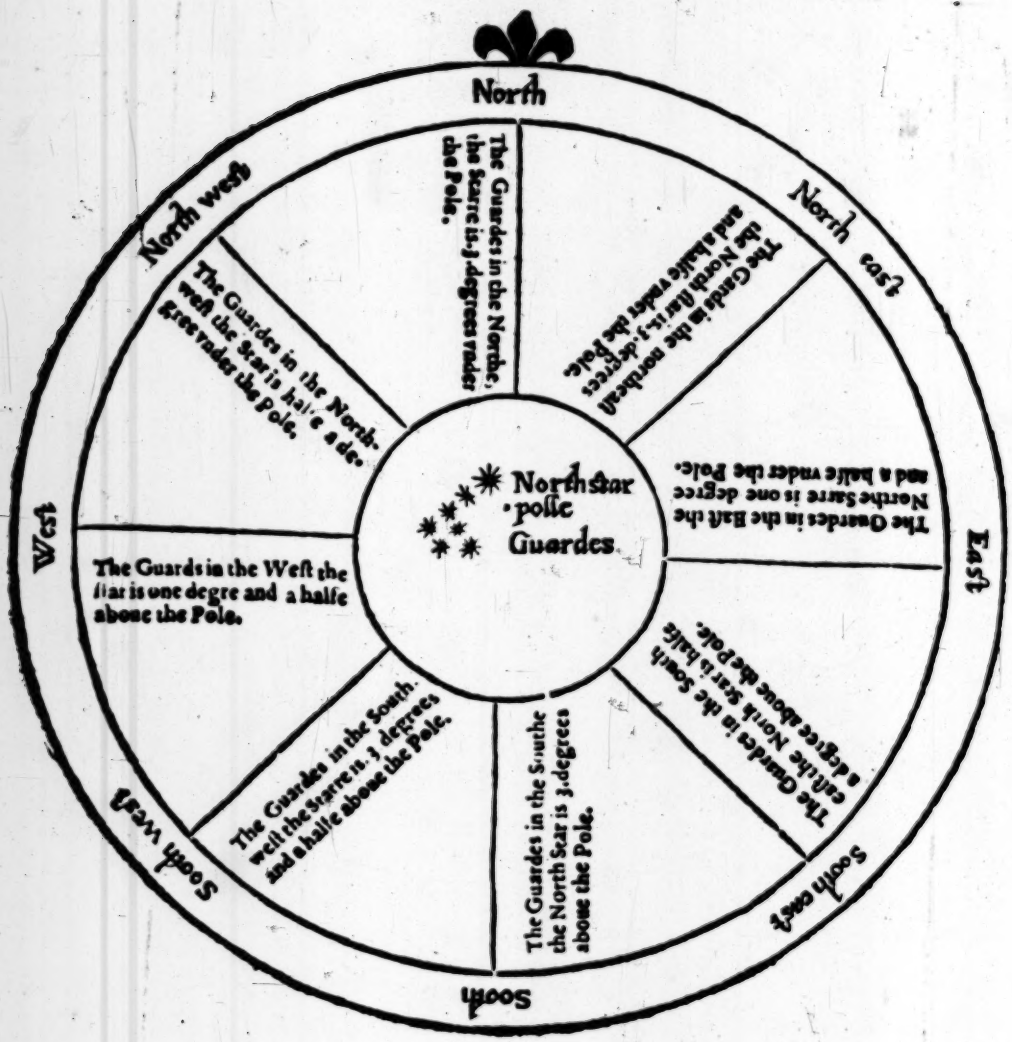
To knowe the length of the day at any time in any place. What the day is.

## The twelfth Chapter is of the North Starre.

AS touching the North Starre I say but little thereof for that it is sufficiently declared in the art of nauigation, the Starre hathe Longitude vnto the signe of Gemini. and from the poles of the world in the signe of Aries, which Star standeth vppon the tippe of the tayle of *Vrsa minor* or little Beare, and hath Latitude frō the line Ecliptick. 66. degrees 30. minutes, and declination from the Equinoctiall. 98. degrees or there aboutes. Here followeth the note, by the guardes to knowe whether the North Starre be aboue the pole, or vnder the pole, and howe manye degrees and minutes. &c.

The North Starres declination.

# The regiment for the Sea.



# ¶ The thirteenth chapter dothe shewe you by the sayling vpon the quarter of your compasse, in how far sayling you do rayse a degree, and what you doe departe from the Meridian, and in the ende there is a Demonstration therof.

FVrthermore, bycause there be some that desire to knowe the alteration of a point: to this ende, that in running of one poynte, they may rayse or lay a degree soner in one than in an other: as in ỹ sayling south or North, keeping one Meridian they rayse or lay the Pole. As this for your example. In going to the North, you doe rayse the Pole and lay the Equinoctial: Contrarywise, going towardes the South, you laye the Pole, and rayse the Equinoctiall. But in sayling or going East or Weast, you do neyther alter your Pole nor Paralele but onely your Meridian. Whereas in sayling of any other poynte, you doe alter both your Pole and Paralele, and also your Meridian. Wherefore I will open vnto you (in sayling vppon one of the quarters of the compasse) what euery pointe doth rayse or lay one degree, in how farre sayling, and howe many myles you be departed from the place you departed from, and what space you be departed from your Meridian. But here is one thing to be noted (as I suppose) in the most part of cardes they allowe for euery degree, but. 17. leagues and a half: your cards be most commonly made in *Lisshborne*, in *Portugal*, in *Spayne*, or else in *Fraunce*. But as I take it, we in England should allowe. 60. myles to one degree: that is, after. 3. miles to one of our Englishe leagues, wherefore. 20. of oure English leagues shoulde answere to one degree, for that. 3. of our myles will not make one of their leagues. And bycause they make their acountes by their leagues in the cardes and not by oures, therefore I

In going southwardes you rayse ỹ equnoctiall & lay ỹ pole: in going to northwardes rayse ỹ pole and lay the Equnoctiall.

Of englishe leagues and spanish leagues.

A mile containeth 1000. paces and euery pase. 5. fote

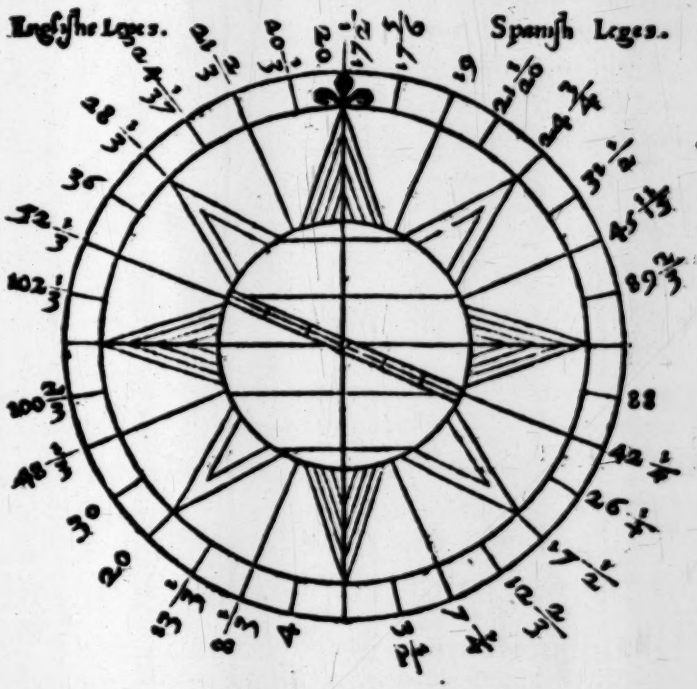
will shew you by our Englishe myles. An English myle conteyneth. 1000. pases, and euery pase. 5. fote, and euery fote. 12 ynches. Nowe some thinke that a pase can not be. 5. fote, but a pase Geometrical is. 2. reasonable steppes, for it can not be a pase vntill the vtter fote be remoued forwards, and those 2. steppes will containe. 5. fote, and so maye any man endure to goe at pleasure. But nowe to our purpose. For the sayling of one quarter of the compasse, this is to be noted. First ỹ in sayling directly south or North, you do raise or lay the Pole a degree in. 60. myles going. In the altering of one point from the South or North in. 61. myles: and you be departed from the lyne of East and West, or the Meridian. 12 myles. In altering of the seconde poynt you rayse a degree in sayling of. 65. myles: and departe from your Meridian. 25. myles. In altering of the. 3. poynte, you doe rayse or lay one degree in sayling. 72. myles and a. 9. part: and are departed from your Meridian. 40. myles. Moreouer in altering of the 4. point, you do raise or lay a degree in the going of. 85. myles: & depart from your Meridian. 60. miles. In altering of the. 5. point or winde, you raise a degree in the sayling of. 108. miles: and depart from your Meridian. 90. miles. In sayling by the 6. point, you raise or lay one degree in. 157. miles: and depart from your Meridian line, 145. miles. Last of all, in sayling by the. 7. pointe or winde, you doe raise a degree in going of. 308. miles, and depart from your Meridian line. 302. miles, and after this manner you may consider of the other three quarters of the compasse. But if you require to knowe the raysing or laying of a degree by the leagues of the cardes: that is, at. 17. leagues and a halfe: then reade the arte of Nauigation, and there shall you finde howe many degrees you be departed fro your Meridian, and also from the place that you departed from: and yet that serueth for no other place but onely for vnder the Equinoctiall, for he that maketh account of it in any other place, shall be deceiued. For euer as you goe to any of the. 2. Poles, your degrees be stil shorter and shorter

A degree is 60. miles or 20. englishe leagues.

A note to knowe in how far sayling you do rayse or lay a degree in the sayling by any one point of the compasse.

till

till ſuch time as your Meridian méete vnder the two Poles, whereof I intreat in the. 16. Chapter. For the better vnderſtanding of ỳ things aforeſayd, looke on this figure following.




## ¶ The. 14. Chapter teacheth to know how far any lande is off from you, knowing but the diſtance betweene any two places: whither you runne along by the lande, or directly to the ſhoare or otherwiſe: with other neceſſarie things.

For that I know it very neceſſarie and profitable for Seamen, to knowe howe neare or farre they be into the Sea, and how neare to the lande, I will intreat thereof for diuers

conſides.

considerations: And first, bicause in rūning alongst the land there may be daunger, which may be such a certaine quantitie into the sea, that they may go both within them and without them. And also in like manner, for that being at one distance from the lande, the land may rise in such a shape or fashion, whereas being nearer, the lande may rise in another forme or fashion: for being far off, you shal see the hils within the lande, and being neare, the hilles or cliffes neare vnto the Sea coast maye take awaye the sight of the lande within. Furthermore also, it is very necessarie to know in what fashion the lande doth rise vpō diuers points of the compasse, as ofte as the fashion of the lande doth alter, and to note it in some booke for remembrance. First by what pointes of the compasse, then the fashion, & last at how far off. &c. For knowledge how farre off you be from the land, you may haue this helpe, if there be any. 2. places by the Sea coast, whereof you knowe the distance, howe many leagues or miles the one is from the other. In going alongst the coast you shall set them vp with your compasse, and when you are thwart of them, if they be but one point asunder, you shalbe. 5. times the distance betweene them from the lande or shoare. If the two places be two pointes asunder, then the distance vnto the shore shall be two times and a halfe the distance. If. 3. points asunder, then the distance vnto the shoare shall be once the distance and a halfe. If. 4. pointes asunder, the same distance shall be betweene you and the shoare, that is betweene the two markes. If. 5. pointes asunder, then is it vnto the shore but. 2. third partes of the distance betweē the. 2. places. If. 6. points asunder, (you being thwart of one of them) then shall the distance vnto the shore be, not halfe the distance betweē the. 2. places. And in al these cases before rehearsed, the one place must be thwarte of you, the other must be a head or sterne of you: and so it is exacte and true. As for ensample this: I (going alongest by any coaste) do know before hand how the one place doth beare from the other, besides this also I know the

I note for the land rysing in diuers shapes or fashions.

To knowe how far the lande is frō you.

Where two lands beduo one point asunder.

the distance, that is to say, howe many leagues they be asunder. As for ensample, the.2. places assigned beare East and West the one from the other, I then (knowing that they be 3. leagues asunder) when I haue brought one of the places South or north of me, do set them with my compasse, the one being North of me, and the other bearing North and by east that is one point asunder: Now the distance vnto the shore, being.5.times the distance betwæn the.2.places which be.3. leagues asunder, I knowe the shoare to be.15. leagues from me, which (if the places were but one league asunder) should be but.5.leagues from the shoare. Furthermore if the places be.2.pointes asunder, that is to say, the one North, and the other North North, then shall the distance vnto the shoare be 7.leagues and a halfe from me. Whereas if the.2.places were but a league asunder, it shuld be but.2.leagues & a half vnto ẏ shore. And furthermore, if the places be.3.points asunder, that is to say, the one North, and the other Northeast & by north, the distance vnto the shore shal be.4.leagues & a half: whereas if the.2.places were but one league asũder, vnto ẏ shore it should be but a league & a half. If.4.points asunder, that is to say, if the one place be due North, and the other place Northeast, thẽ it is vnto the shore.3.leagues iust. If but one league asunder then but one league vnto the shore. Moreouer if the 2.places be.5.points asunder, that is to say, the one north and the other Northeast & by East, then ẏ distance vnto the shore shall be but.2.leagues: whereas if the.2.places were but one league asũder vnto the shore shuld be but.2.miles. Last of al, if the.2.places be.6.pointes asunder, that is to say, the one north, and the other east northeast, then it shall not be a league and a halfe vnto the shore.&c. But if you come directly to ẏ land wards, hauing no cause to be thwart of none of those knowen places, then to know how far you be from the lande you must do as is by the places before spokẽ of. For if you go in due north the one place being north & by west, & the other north and by east: then (the.2.places being 3.leagues asunder)

Of.2.places to be one point asunder.

To be two points asunder.

3.pointes asunder.

4.pointes asunder.

5.pointes asunder.

6.pointes asunder.

Of going or sayling right into the shore.

ber) you shall be. 7. leagues and a half from the shore: so that if you runne into the shore due north vntill they be. 4. poynts asunder, that is to say, the one north northwest, and the other north northeast, then it shall be vnto the shore. 3. leagues and 3. quarters. And furthermore, you still running in due north, till the. 2. places be. 6. pointes asunder, that is to say, the one place to be northweaste and by north, and the other place to be northest & by north, the distance vnto the shore shall be. 2. leagues and a quarter. And again, if you runne in due north, vntill they be. 8. pointes asunder, that is to say, the one place northweast, and the other northeast: then the distance vnto the land or shore shall be but half the distance between the. 2. places, that is, but one league and a half. Lastly, if you run to the land due north, vntill the. 2. places be. 10. points asunder, that is to say, the one place northweast and by weast, and the other northeast and by east, then the distance vnto the shore shall be but one third part of the distance betweene the. 2. places, that is, but one league from the land. &c. Thus much haue I saide as touching the bearing of the lande from you, by the points of the compasse, to know the distance or how farre the land is of: which is very necessary for Seamen to know for diuers considerations as I sayd before. If now therefore you knowe not howe one headland doth beare from another, doe thus: In running alongst the coast, when you se the appearing of any lande one before another, set them with your compasses, and loke how they beare from you, by what point of the compasse, and so shall you know iustly how the one lande doth beare or lye from the other. And by this order you may correct your plats, by doing this, as often as you see. 2. notable places togither: as Ilands, rocks, headlands, mouthes of hauens, sandes, or what soeuer else be worthy of noting, this done, as often as you do se them togither, set them with your compasse, & that wil shew you most certainly, that so they do beare the one from the other. You may know the distance in like maner betweene them, if you knowe your ships way, as

A way to knowe how one headland beareth of another.

thus,

thus, whē you first see any.2. places togither, as.2. headlands, or.2. Ilands, hauing set them with your compasse, and knowing how the one beareth from the other then, for that you will not come neare vnto them, you do hale off from the land, vntill that you haue brought your selfe farre inough off at youre discretion, and when you be thwart of the firste headland, set the other land, and consider howe it beareth from you: then recken your ships way, how many leagues the shippe might goe vntill you come thwarte of the other headlande, keeping your course along as the.2. headlandes beare, and so shall you both knowe the distance betweēn the.2. places, and also how farre you be off from them. In like maner, hauing consideration of the distance betweene the other places that you haue obserued both by your compasse and also by the shippes way, you may know how farre it is to the shore, going right to the lande wardes, by your crosse staffe, although you knowe not the distance betweēn any two places. As thus: take the wideneſſe betweēn any two places with your crosse staffe, bearing right to the land wardes, and then remoue the crosse staffe or transitorie halfe the length of the transitorie, that is to saye, the end next vnto you, and then by running in till the.2. ends of the transitorie doe agrée with the two markes, you shall be halfe way to the shore: then loke howe farre the shippe hath gone in that time, for the same distance is vnto the land frō the ship. But if you remoue the transitory but a quarter of length of the transitorie to youwards, then at the place wher the end of the transitorie doth agrée with the.2. markes, shall be one quarter of the distance betweene the shore & you at the first obseruation: & it shall be.3. times that quantitie vnto the shore. &c. And to know the ships way, some do vse this which (as I take it) is very good: they haue a pece of wood & a line to bere out ouer borde, with a small line of a great lengthe whiche they make fast at one ende, and at the other ende and middle, they haue a piece of a line which they make fast with a small thred to stande like vnto a crowsote: for this pur-

To knowe the distance at the Sea betweene a-ny.2. headlandes.

To knowe howe far it is vnto the land an o-ther way.

To knowe the shippes way.

pole, that it should driue a sterne as fast as the shippe doth go away from it, alwayes hauing the line so ready that it goeth out as fast as the shippe goeth. In like manner they haue either a minute of an houre glasse, or else a knowne part of an houre by some number of wordes, or suche other like, so that the line being vered out and stopt iuste with that time that the glasse is out, or the number of wordes spoken, which done, they hale in the logge or piece of wode againe, and loke howe many fadome the shippe hath gone in that time: that being knowne, what part of a league soeuer it be, they multiplie the number of fadomes, by the portion of tyme or part of an houre. Whereby you may knowe iustly howe many leagues and partes of a league the ship goeth in an houre. &c.

An englishe league. 2500 fadome.

A Spanish league. 2857. fadome.

For an Englishe league doth containe. 2500. fadome. And a spanish or portingale league doth contain. 2857. fadomes. &c.

## ¶ The fiftenth Chapter or rule treateth of the Longitude. &c.

NOwe some there be that be very inquisitiue to haue a way to get the longitude, but that is to tedious. For this they must consider, that the whole frame of the firmament is caried round from the east to the west in. 24. hours, so as ther remaineth neither light nor marke, but goeth rounde, sauing only the. 2. poles of the world, and these. 2. stand alwayes fast. But (as I sayd before in the. 9. rule) of him that going South or North doth raise or lay the pole, and in like case of the Equinoctiall altering his paralele, and causing the light of the firmamēt to alter the time of their shining or abiding aboue our Horizon: so he that goeth directly east or weast, doth neither raise nor lay the pole, so that still the lights of the firmamēt doth make one maner of arch according to their latitude or declination: but the going East or Weast doth alter the Meridian, causing ỳ planets to haue their aspects at another hour or time, altering ỳ time of the changes of ỳ moone & also

Altering ỳ time of rising and setting of the lights.

the

the time of the Eclipses: which is necessary for all travellers by Sea or by lande. Therefore I thought it needefull to be spoken of: for as countries haue Latitude from the pole: so in like manner they haue appointed Longitude. Now therefore you may get the Latitude with instrumentes, but the Longitude you must bring from another place, which you can do but with a globe or else a mappe or card, and then you must measure from the Meridian of the Canarie Ilands, otherwise called the fortunate Ilandes. And in oure Latitude of London euery. 555. miles whiche conteineth. 15. degrees wil aunswer to one houre of time: and vnder the Equinoctiall. 900. miles to. 15. degrees: the degrees be as long as the degrees of Latitude, but towardes the pole fewer and fewer till they come to nothing vnder the. 2. poles. And nowe. 37. miles which are at London, will aunswer to one degree of our Latitude at. 51. or. 52. degrees of elenation of the pole, but the cause why the Longitude was fetched from the Canarie Ilands I know not, but it was as I suppose, bycause it was then the westermost place then knowen: for Ptholemeus was the firste that ordeyned that rule.

Altering the aspects.

Of Latitude and Longitude.

15. degrees is an houre of time and at London it is. 555. miles.

Longitude beginneth at the Canary Ilads

Nowe furthermore bycause you shall knowe the better, I would draw out certain of the cheefest places about thys Realme of England, both their Longitude and Latitude, by which you shall know what manner of Arch the Sun with the other lights bothe make, and also by the Longitude you may know at what time the Mone with any of the Planets both make any aspect. Besides this, the Eclipses of the Sun or Mone, with the chaunge, quarters, and full Mone, by a true and exact Ephemerides through all England to knowe the verie true houre and minute of the time of the diameter: considering for what Longitude or place your Almanacke was made. And now to get the Longitude, you may do it at the time of the Eclipse of the Mone, for that the Eclipses of the Mone be generall, so that she being aboue your Horizon in any place vpon the superficiall parts of the earth

To know the true time of the aspects of the Mone.

or Sea, conſideering (as I ſaid before) by your Almanacke, at that time when the Eclipſe ſhould happen, the very houre and minute, knowing alſo the place that your Almanacke was made for: that done, according to this rule, with a preciſe inſtrument you ſhall take the alteration of the time with the houre and minute of the Eclipſe. And furthermore you might know your Longitude with the Ephemerides, by the coniunction of the Mone with other fired Starres, if it were not for one great infirmitie, and that is the paraler of the Mone, whiche the ſemidiametre of the earth doth cauſe, by the nerenelle of the Mone vnto the earth: wherefore I woulde not any Sea men ſhoulde be of that opinion that they mighte get anye Longitude with inſtrumentes. Therefore let no Sea men trouble themſelues with anye ſuch rule, but (according to their accuſtomed manner) let them keepe a perfite accompt and reckening of the way of their ſhippe, whether the ſhippe goeth to lewards or makith hir way good, conſidering alwayes what thinges be againſt them or with them: as tides, currents, winds, or ſuch like. As for the rule of Longitude, it followeth in the nert Chapter.

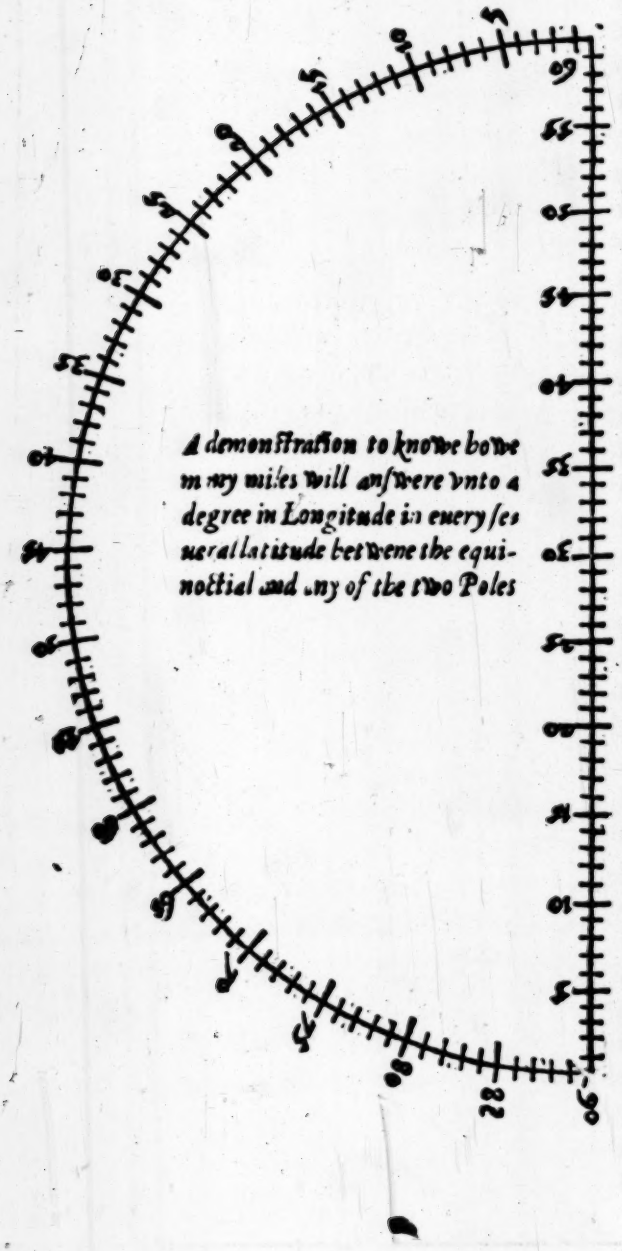
The Longitude is not to be gotten with inſtrumēts on ỹ Sea.

The

# The.16. Chapter sheweth how many miles vvill aunſvver to one degree of Longitude, in euery ſeuerall Latitude, betweene the Equinoctiall and any of the 2. poles: with the demonſtration for that purpoſe: and the diuerſities of aſpectes of the Moone.

NOw by this rule ſhal I teach you how many miles will anſwer to one degrée, for euery ſeuerall Latitude to any of the.2.poles either articke or antarticke. And firſt, vnder the Equinoctiall (the.2.poles being euen with the Horizõ)60.miles do anſwer to one degrée, as I ſaid in the.15.rule. And now ſhall follow the reſt. Where the poles be raiſed.21. degrées. 56.miles belongeth to one degrée of Lõgitude. Now ỹ poles being rayſed.29. degrées.52.miles do anſwer to one degrée. The poles being raiſed. 36.degrées.48.miles do anſwer to one degrée. The poles.42.degrées rayſed.44.miles goeth to one degrée of Longitude. The Pole raiſed.57.degrées.32.miles to one degrée. The Pole raiſed.62.degrées.28. miles to one degrée. The Pole raiſed.66.degrées.24.miles to one degrée. The Pole rayſed.70.degrées. 20. miles to one degrée. The Pole rayſed.74.degrées.16.miles to one degrée. The Pole rayſed.78.degrées.12.miles to one degrée. The Pole rayſed. 82 .degrées. 8. miles to one degrée. The Pole rayſed.86.degrées. 4. miles to one degrée. The Pole being rayſed to the hyeſt at.90.degrées (being then your Zenith) there all the Meridians méete.

*A de-*




This demonstration doth shewe you, howe manye myles wyll aunswer to a degree, for euery seuerall Altitude of ye Pole in the halfe circle is marked ye eleuation of ye Pole: in the lyne of Diameter, or right line, is marked the miles answering euerye degree: and to know howe many miles wil aunswer vnto one degree, first lay ye threed vnto the eleuation of the pole that you do require ye number of myles vnto, one degree: & then the iust length

length of the threde being marked, lay the threde vnto the line of Diameter, or right line, whiche is the line of miles, and then you shall see at that place is the number of miles vnto one degree &c. Now you must consider that euery houre of time in the chaunging of the Mone or of the Eclipses you must allow .15. degrees, euery degree in miles as you do see in your Latitude of the countrie, as thus: those places ỹ be to the Westwards of your towne, place or countrie by .15. degrees the Mone shall chaunge rather with them thā with you by one houre, bycause that they shall touch your Meridian before theirs by one houre. And if the towne or place be to the Eastwards of you by .15. degrees, then shall the Mone chaunge rather with you than with them by one houre, as for an ensample thus, with vs at London, the .xx. day of May 1574. the Mone shall chaunge at .12. of the clocke at Mone .5. minutes. Now to the Westwards as farre as Lisbburne in Portingall the Mone shall chaunge that same day at .11. of the clocke .8 minutes, the Longitude being thereof from the Canarie Ilands .5. degrees .36. minutes. Now to the Eastwards, that same day at noone, the Mone shall chaunge at one of the clocke .12. minutes, bicause that they haue Longitude .36. degrees .40. minutes from the Cannary Ilands and then by this accompt .7. degrees and a halfe will answer to halfe an houre, and then .3. degrees and a quarter will make a quarter of an houre, and then .9. miles and a quarter will make one minute of time with vs at London in our Latitude, so by this rule you may knowe at what time and minute the Eclipses or chaunges of the Mone doe happen, knowing for what place your Almanacke was made, for commonly we here in England do make them for the cittie of London. Thus muche haue I saide as touching the true time of the chaunge of the Mone, for that some people (as I haue sayde before in the 3. chapter) do contemne and saye, why do they not giue or make rules for euer to knowe the houre and minute of the chaunge, full, and quarters of the

15. degrees answereth vnto an houre of time.

Noon

To knowe ỹ true time

of ỹ change & quarters of the moon is a question astronomicall, geometricall and cosmographicall.

Moone? And yet they be vtterly voyde of any knowledge in the Mathematicall Science, whereby they might knowe the true time of the chaunge of the Moone: For it is a question Astronomicall, to know the Moones motion: a question Geometricall, to know the true time of the aspectes, or measure betweene the Sunne and the Moone: and thirdly, it is a question Cosmographicall, to knowe the true Longitude of the place he is in, at the time when the Moone chaungeth. &c. Nowe foloweth the next rule whiche shall treate of Longitude and Latitude.

## ¶ The. 17. Chapter or rule treateth of the Longitude and Latitude of certaine of the most notable places in Englande: and also howe long the Moone doth change at the one towne before the other: with the diuersitie of the longest day in Sommer, from South Hampton to the Northermost parte in Scotland.

NOwe in this rule foloweth the Longitude and Latitude of the most part of the principall places in England. The Southermost place in England, is the Lizarde in Cornwal: the Longitude thereof is. 15. degrees. 5. minutes: the Latitude 50. degrees. 45. minutes. S. Michaels Mount hath in Longitude. 14. degrees. 20. minutes: in Latitude. 51. degrees. 6. minutes. Falmouth hath Longitude. 15. degrees. 12. minutes: Latitude. 51. degrees. 0. minuts. Plimmouth hath Longitude 19. degrees. 7. minutes: Latitude. 51. degrees. 1. minute. South Hãpton Longit. 18. degr. 52. minuts: Latitude. 51. degr. 2. mi. Portsmouth Longitude. 19. degrees. 7. minutes: Latitude. 51 degrees. 3. minutes. Rye Longitude. 20. degrees. 22. minutes: Latitude. 51. degrees. 5. minutes. Douer Longitude. 21. degr. 40. minutes: Latitude. 51. degrees. 26. minutes. Canterburie Lon-

Longitude.21.degrees.25.minutes: Latitude.51.degr.28.mi· Sandwich Longitude.21.degr.38.minuts: Latitude.51.degr. 29.minutes. London Longitude.15 degr.54.minutes: Latitude.51.degr.32.minuts. Grauesend Longitude.20.degr.14. minuts: Latitude.51.degr.31.minuts. Bristowe Longitude 17.degr.8.minutes: Latitude.51.degr.42.minuts. Yaruarde Longitude.17.degr.0.minutes: Latitude.52.degr.2.minuts. S. Dauids head Longitude.15. degr.5.minuts: Latitude.52. degr.15.minuts. Orford Longitude.18.degr.59.minut: Latitude.51.degr.50.minuts. Cambridge Longitude.20.degr.6 minuts: Latitude.52.degr.0.minuts. Norwich Longitude 21.degr.20.minuts: Latitude.52.degr.10.minuts. Lincolne Longitude.20.degr.28.minuts: Latitude.52.degr.6.minuts. Welshpoole Longitude.16. degr. 40. minutes: Latitude.53. degr.6.minuts. Westchester Longitude.15.degr.29.minuts: Latitude.53. degr.34.minuts. Hull Longitude.20.degr.54. minuts: Latitude.53.degr.57.minuts. Yorke Longitude.20 degr.0.minuts: Latitude.54.degr.1.minute. Cockermouth Longitude.17.degr.0.minuts: Latitude.55 degr. 8.minuts. Carlyle Longitude.17.degr.48.minuts: Latitude. 55.degr. 2.minuts. Newcastle Longitude.20.degr.31.minuts: Latitude.55.degr.0 minuts. Barwicke Longitude.20.degr.48. minuts: Latitude.56.degr.23.minuts. Edenborow in Scotlande, Longitude.19.degr.50.minuts: Latitude. 57.degr.0. minuts. Now by the Longitude & Latitude you may know the length of the day both in Sommer and in Winter, with the perfit houre and minute of the changes of the Mone, and how long the Mone doth change at one towne before another, through the whole realme of England. And now in order as I haue begon before, I will shewe you the distance of time. And first at S. Michaels Mount, the Mone changeth rather than at London by 25. minuts. Rather at Falmouth than at London by.20.mi. At Plimmouth rather than at London by.18.min. At South Hampton rather than at London by 5.minuts. At Portsmouth rather than at Lon.by.4 minuts.

To know ye diuersitie of the time of the change of the moon through all England.

At Rye later than at London by one minute and ½. At Douer later than at London by. 6. minutes and more. At Canterburie later than at London by. 5. minutes. At Sandwich later than at London by. 6. minuts. Graueſend later than at London by one minute and a halfe. Bꝛiſtow rather than at London by. 11. minutes. Harward rather than at London by 12. minutes. Saint Dauids head rather than at London by 29. minutes. Oxforde rather than at London by. 4. minuts. Cambꝛidge later than at London by. ½. partes of a minute. Norwich later than at London by. 5. minuts and more. Lincolne later than at London by. 2. minutes. Welſhpoole rather than at London by. 16. minutes. Weſtcheſter rather than at London by. 10. minutes. Hull later than at London by. 4. minutes. Yorke later than at London by. ¼. of a minute. Cockermouth rather than at London by. 12. minutes. Carelyle rather than at London by. 9. minutes. Newcaſtle later than at London by. 2. minutes. Barwicke later than at London by thꝛee minutes and more.

The cauſe why that it is called the chaunge of the Moone, is foꝛ that the Moone chaungeth the ſydes of the Sunne, foꝛ beforꝛe the change the Moone is on the Weſt ſide of the Sun: and after the chaunge, the Moone is on the Eaſte ſide of the Sunne. &c. Nowe in like manner, I thinke it neceſſarie to be ſpoken of the differẽce of the longeſt day in Sommer, in euery ſeuerall Latitude, thꝛough the whole Realme of England frõ the Southermoſt part, called the Lizard, to the Nꝛthermoſt part in Scotlande: and this is called the day, from the Sunne ryſing oꝛ appearing aboue the Hoꝛizon.

To know the length of the longeſt day through all England & Scotlande.

Firſte at South Hampton the longeſt daye is. 16. houres long. 26. minutes, the ſhoꝛteſt. 7. houres. 54. minutes. At London. 16. houres. 30. minutes longeſt. 7. houres. 30. minuts ſhoꝛteſt. At Lincolne. 16. houres. 45. minuts longeſt. 7. hours 15. minutes ſhoꝛteſt.

At Yoꝛke, the longeſt. 17. houres, the ſhoꝛteſt. 7. houres. Newcaſtle the longeſt. 17. houres. 12. minutes, the ſhoꝛteſt. 6. houres

houres.48.minutes.Barwicke,the longeſt.17.houres.30.minutis,the ſhorteſt.6.houres.30.minuts. Edenborow in Scotlande,the longeſt day in Sommer.17.houres.45.minuts, the ſhorteſt day.6.houres.15.minutes. Now Caines point being the northermoſt part in all Scotlande,the Pole being raiſed to.62.degrées, there the longeſt day is.19.houres.30.minuts, the ſhorteſt daye.4.houres.30.minutes. Nowe this you doe conſider,loke what the longeſt day doth containe,loke what that lacketh of.24.hours,that is the ſhorteſt Winter day. &c.

## The eightenth Chapter or rule ſhewyeth howe to ſayle by the Globe.

NOw to ſayle by the Globe, it is conuenient to be ſpoken of. For that generally the moſt part of the ſeamen make their account as though the earth wer a platforme. For they do not conſider that the earth is a Globe,and that the Meridians do growe narrower and narrower towards the.2.poles, for it is vnpoſſible to drawe the face of the earth and the Sea true vpon a platforme, for if you wil deſcribe the lande true, then ſhall not the Sea be true, for as you go towardes the North partes, your Meridians growe togither, ſo as your lines or pointes be according to the arte of Hydrography, for the Sea ſhall be broader to the North partes than it is. Nowe and if you woulde deſcribe the Sea true, with lines, courſes, diſtances, hauens and daungers, then ſhoulde your lande be broader to the North partes than it is. As for enſãple, thus: Englande and Scotlande being both one Ilande, in all your Cardes of Nauigation, the North parte of Scotland is drawn much bigger than it is,for otherwiſe the lines of South & North ſhoulde not be according to the treating of the lande, for if you viewe it well, you ſhall finde the North

You cannot drawe the Land & ſea true vpon a flat thing.

To make a Sea plat or carde.

ende of Scotlande much more in distance than it is. As you may see in measuring it by the trunke of youre carde there. For youre better vnderstanding, I will shewe you the compasse of the earth vnder sundrye Paralels or Circles, howe many myles the earthe doth contayne in compasse. Fyrst, vnder the Equinoctiall (where the earthe is at the greatest compasse) in going directly Easte or Weaste, that is, by a ryghte line ouer Sea and Lande, the two Poles being euen wyth your Horizon: you haue. 21600. myles to come to the place you departed from. Vnder the Tropicke of Cancer, the North Pole being rayſed. 23. degrees. 28. minutes, going directly East & West: it is. 19800. miles in compasse in our artick circle of London wher the pole artick is raised. 15. deg. 32. minuts, going East & west: it is. 13320. myles in compasse, then vnderneath the Polars circle where the Pole is rayſed fyrtie fiue degrees, thirtie two minutes: it is. 8460. miles in compasse. By this you see that the' compasse of the East and Weast lyne (comming from the Equinoctiall) is muche lesser to the North wardes than it is to the South wardes. Wherefore when you shall haue any occasion to attempte any voyage to the North parts, it is best to sayle by a Globe: for so shall you better see the distances and bignesse of the landes, and in like manner your lines and courses. In this order, fyrste (according to the accustomed manner) keepe a perfitte accounte and reckoning of the waye of the shippe, by what lyne or poynte your Shippe hathe made hir waye good, then muste you resorte to youre Globe. After that consider what place and Paralell you be in, whiche you maye doe by the Sunne by daye, and by the Starres by nyght. Nowe (knowing what place and Paralel you be in) sette youre Globe to the eleuation of youre Pole: that done, turne to the place of youre Zenith, and seeke the oppoſite of it in your Paralell: for then you knowe that in the same Paralell is youre Easte and Weaste lyne: that had, the iuſte quarter of that circle to the Pole, muste be deuided into the eight pointes of your compasse, doing so likewise on

The compasse of the earth.

The compasse of the earth vnder ỹ tropick of Cancer.

The artick circle of London vnder the Polars circle.

How to vſe the globe to direct your course, and to knowe how that any place doth beare.

the

the other ſide. In like caſe if you come to the Southwards, deuide your. 8. wyndes from your Antarticke Pole, to youre Paralell circle: and thus muſt you doe euer and anon, for the oftner you do obſerue this cuſtome, the better & perfiter ſhal your courſe be. Now thus briefly I make an end of ỹ ſayling by the Globe. But for them that do occupie the Southparts, nothing is better than their cardes. Bycauſe I haue declared vnto you the length of certayne of the Paralels, what myles the Earth doth contayne in compaſſe vnder them, now wil I ſhew you how many myles diſtance is betwen euery one of them. And firſt, from the Equinoctiall to the Tropick of Cancer, (which is there where the Sun maketh his furtheſt progreſſe to the Northy partes) it is. 1408. myles. Secondly, betwen the tropick of Cancer & our Artick circle of Londō it is 1684. miles. Thirdly, betwen our Artick circle & the Polare circle is. 900. myles. Laſtly, betwene the Polare circle and the Pole is. 1408. myles. So that it is in all from the Equinoctiall to eyther of the two Poles. 5400. miles: whiche is the fourth part of the compaſſe of the whole Earth. Furthermore, for that you may the better vnderſtande that the Earth is a Globe or Circular (which any perſon that doth occupie the Sea, ſeeth moſt apparantly) you ſhall perceiue it thus, if you ſee a Shippe any thing farre off, you may perfitly ſee ỹ ſayles of it, but not the whole, the cauſe wherof is the circularneſſe of the earth and the water of the Sea: for that the water doth riſe and ſwell betwen you and the other ſhip, accordyng to the diſtance betwen both the ſhips: bicauſe the diſtance to the center of the earth or water, is in euery place alike. And he that hath deſire to know further herof, M. Dee hath made mention therof in *Euclides Elementes* in his mathematical preface, & alſo in the. 12. booke, whither you may haue recourſe, yet notwithſtanding I wil ſay a litle therof, wherby you may diſcerne how far it is poſſible to ſee a ſhip vpon the ſea: as thus: if you be on ỹ ſea in a ſhip, ſo ỹ ther be but halfe a league betwene you and the other ſhip, the water wyll be fyue yardes and a halfe hygher in the middle of the waye betweene

The diſtāce betwen the equinoctiall and the tropick of Cancer.

Betwen ỹ artick circle of London & the tropik of Cancer.

The cauſe why that you may ſee the ſayles of a ſhip & not the whole.

betwæn bothe the ships, for that the water is equall in euery place vnto the center of the earthe, and then the water going by a croked line, then to strike it by a right line, the middle of the line that shoulde come from the center of the earth, shall be shorter than the other. 2. lines comming from the center of the earth betwæne the. 2. shippes by. 5. ynches and a halfe, and then it must nedes be sayde, that the water is hygher by the said. 5. ynches and a halfe. And furthermore, if the two shippes were a league asunder, then the water by his circularnesse shuld be. 22. ynches hygher than the leuell in the middle betwæne both the shippes. Furthermore, if the. 2. ships be 2. leagues asunder, then the water shall be higher than the leuell in the middle betwæne bothe the shippes by. 88. ynches, which is. 7. fote and. 4. ynches. If the. 2. shippes be. 3. leagues the one from the other, then the water shall be higher than the leuell in the midway betwæne both the shippes, by. 198. inches, whiche is 16. fote and a halfe. Furthermore, if the. 2. shippes be. 4. leagues asunder, the water shall be higher than the leuell in the midway betwæne both the shippes by. 252. ynches, which is. 29. fote and. 4. ynches. And furthermore, if the. 2. shippes were. 5. leagues asunder, the water shoulde be higher than the leuell of the midway betwæne both the ships by. 550. ynches, which is. 46. fote lacking. 2. ynches. Yet furthermore, if the. 2. ships were. 6. leagues asunder, the water should be higher than the leuell in the middle way betwæne them by. 792. ynches, which is. 66. fote. Furthermore also, if the. 2. shippes were. 7. leagues asunder, the water should be higher than the leuell in the midway betwæn both the ships by. 1878. ynches, and that is. 90. fote, whiche is as farre & rather farther than it is possible to see any ship vpon the sea: Neyther is it possible to see any lande further, but such lande as is very high lande, whiche for the greatnesse of the heigth you may see it, wherfore. 7. leagues or. 6. leag. is called a hen.

To knowe howe many foote and ynches that the water is higher than the leuell of the sea betweene two ships.

What a hen is, and the cause why you may see a ship further out of the top than vpon the hatches.

Now the circularnesse of the earth is the cause that you may see a shippe or land further out of the top than, vpon the hatches:

The vse of this Table is this: when you haue taken the heigth of any of these Starres vpon the Meridian, then loke what declination the Starre hath from the Equinoctiall: if the star haue North declination, then subtract or take away the stars declination from the heigth: if it haue South declination, then adde or put vnto the heigth the starres declination, and that will shewe vnto you the heigth of the Equinoctiall, and then by the heigthe of the Equinoctiall the heigth of the Pole is knowne, as the.7. Chapter doth declare. And now I thinke it conuenient to make certaine Tables, to shewe vnto you at what houre and time any of these starres be vpon the Meridian, whereby they maye the better knowe these Starres. I will also shewe vnto you howe long any of these Starres doe shyne or tarry aboue the Horizon in this Latitude from the Equinoctiall of London, that is at.51.or 52. degrees. And also at what poynte of the compasse any of these Starres do ryse or set, which will serue this.100.years without much error.

How to vse the starres declination to know the heigth of ye Pole.

## ¶ A Table to knowe the rysing and setting of these Starres, by vvhat poynt of the cõpasse, and howe many houres they be aboue our Horizon, the Pole being rayſed. 51. or. 52. degrees.

The Whales backe ryseth East and by South, and vnto the South wards: and shyneth.10.houres and better.

The Whales belly (in a maner) as the whales backe.

The Rammes Horne riseth Easte Northeast, and setteth Weast Northwest: and shineth.15.houres.16.minuts.

The Rammes Heade ryseth East Northeast, and setteth Weast Northwest: and shineth.16.hours.4.minuts.

The Bulles Eye ryeth neare the Easte Northeast, and setteth neare the Weste Northwest: and shyneth.15.houres 2.minutes.

The Orions left foote riseth neare the East and by South, and setteth neare the West and by Southe: and shineth.10. houres and.6.minuts.

The Orions leste shoulder ryseth East and to the Northwardes, and setteth West and to the Northwardes: and shineth.12.houres.45.minuts.

The firste in Orions girdle doth rise a little to the Southwardes of the East, and setteth a little to the Southwardes of the West: and shineth.11.houres.46.minuts.

Orions right shoulder riseth East, & vnto the Northwardes, and setteth West and vnto the Northwardes: and shineth.13. houres.12.minuts.

The great Dogge riseth East Southeast, & setteth West Southwest: and shineth.9.houres.

The lesser Dogge riseth Easte and vnto the Northwards, & setteth West & vnto the Northwardes: & shineth.13.h. 10.min.

The brightest in Hydra ryseth Easte and vnto the Southwardes, and setteth West and vnto the Southwardes: and shineth.11.houres.7.minutes.

The Lions necke riseth East Northeast and to the Northwardes, and setteth West Northwest and to the Northwardes: and shineth.16.houres.16. minutes.

The Lyons hart riseth neare the East Northeast, and setteth neare the West Northwest: & shineth.14 houres.50.min.

The Lions backe riseth neare the Northeast and by East, and setteth neare the Northwest and by West: and shineth.16. houres.26.minutes.

The Lions tayle riseth neare the East Northeast, & setteth neare the West Northwest: and shineth.15.houres.12.minutes.

The Rauens head ryseth neare the East Southeast, and setteth neare the West Southwest: & shineth.8.houres.12.min.

The Rauens wing riseth neare the East Southeast, and setteth neare the West Southwest: & shineth.8.houres.50.mi.

The Virgins spike riseth East & to the Southwards, & setteth West & to the Southwards; & shineth.11.houres.4.min.

Betweene

Betwéne Bootes thyes riſeth neare the Northeaſt and by Eaſt, and ſetteth neare the Northweſt and by Weſt, and ſhineth. 16. houres. 20. minutes.

The South Ballance ryſeth neare the Eaſt Southeaſt, and ſetteth neare the Weſt Southweſt: and ſhineth. 9. houres. 36. minutes.

The North ballance riſeth neare the Eaſt & by South, and ſetteth neare the weſt & by South: and ſhineth. 10. hou. 38. min.

The Scorpions heart riſeth neare the Southeaſt and by Eaſt, & ſetteth neare the Southweſt & by Weſt: and ſhineth 7. houres. 5. minutes.

Hercules head riſeth neare the Eaſt Northeaſt, and ſetteth neare the Weſt Northweſt: & ſhineth. 14. houres. 56. min.

The Serpẽts head riſeth neare the eaſt northeaſt, & ſetteth neare the weſt northweſt: & ſhineth. 14. houres. 40. minutes.

The Eagle riſeth neare the Eaſt and by North, and ſetteth neare the Weſt & by North: and ſhineth. 13. houres. 24. min.

The Dolphines tayle riſeth Eaſt and by north, and ſetteth weſt & by North: and ſhineth. 15. houres. 57. minutes.

The Goates tayle riſeth neare the Eaſt ſoutheaſt, & ſetteth Weſt ſouthweſt: and ſhineth. 9. houres. 20. minutes.

The water pourers leg riſeth neare the Eaſt Southeaſt, & ſetteth Weſt ſouthweſt: and ſhineth. 8. houres. 54. minutes.

Pegaſus ſhoulders riſeth neare the Eaſt Northeaſt, & ſetteth neare the Weſt northweſt: & ſhineth. 14. houres, 32. minutes.

Pegaſus legge riſeth neare Northeaſt, and ſetteth neare Northweſt: and ſhineth. 17. houres. 6. minutes.

The Whales tayle riſeth Eaſt Southeaſt, & ſetteth Weſt Southweſt: and ſhineth. 7. houres. 48. minutes.

Furthermore if you deſire to know the time of any of theſe ſtarres, beeing above the Horizon in all Latitudes, then repayre to the. 11. chapter: ſo you ſhall know it there by their declination: euen by the ſame order that you know the ſunnes beeing above the Horizon, by the ſunnes declination.

The. 11. chapter will ſhewe howe long any of theſe ſtars will ſhine in all places.

# A Table of the fixed Starres.

| | These Stars being south from the first day of January vnto the. 15. day. | | | January frō the 15. day to ỹ last. | | | Februarie from ỹ 5. vnto the. 15. | | | Februarie from ỹ 15. to the last. | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Whales backe. | 5.20 | E | 1 | 4.20 | DA | 1 | 3.20 | DA | 1 | 2.20 | DA |
| 2 | Whales belly. | 5.54 | E | 2 | 4.54 | DA | 2 | 3.54 | DA | 2 | 2.54 | DA |
| 3 | Rammes horne. | 6.28 | E | 3 | 5.28 | E | 3 | 4.28 | DA | 3 | 3.28 | DA |
| 4 | Rammes head. | 6.45 | E | 4 | 5.45 | E | 4 | 4.45 | DA | 4 | 3.45 | DA |
| 5 | Bulles eye. | 8.52 | E | 5 | 7.52 | E | 5 | 6.52 | E | 5 | 5.52 | DA |
| 6 | Orions left fote. | 9.23 | E | 6 | 8.23 | E | 6 | 7.23 | E | 6 | 6.23 | E |
| 7 | Orions left shoulder. | 9.28 | E | 7 | 8.28 | E | 7 | 7.28 | E | 7 | 6.28 | E |
| 8 | First Orions girdle. | 9.50 | E | 8 | 8.50 | E | 8 | 7.50 | E | 8 | 6.50 | E |
| 9 | Orions right shoulder | 10.12 | E | 9 | 9.12 | E | 9 | 8.12 | E | 9 | 7.12 | E |
| 10 | Great Dogge. | 11.4 | E | 10 | 10.4 | E | 10 | 9.4 | E | 10 | 8.4 | E |
| 11 | Lesser Dogge. | 12.0 | | 11 | 11.0 | E | 11 | 10.0 | E | 11 | 9.0 | E |
| 12 | Brightest in *Hydra.* | 12.4 | M | 12 | 11.4 | E | 12 | 10.4 | E | 12 | 9.4 | E |
| 13 | Lyons necke. | 2.12 | M | 13 | 1.12 | M | 13 | 12.12 | M | 13 | 11.12 | E |
| 14 | Lyons heart. | 2.13 | M | 14 | 1.13 | M | 14 | 12.13 | M | 14 | 11.13 | E |
| 15 | Lyons backe. | 3.0 | M | 15 | 2.0 | M | 15 | 1.0 | M | 15 | 12.0 | |
| 16 | Lyons tayle. | 3.42 | M | 16 | 2.42 | M | 16 | 1.42 | M | 16 | 12.42 | M |
| 17 | Rauens head. | 5.2 | M | 17 | 4.2 | M | 17 | 3.2 | M | 17 | 2.2 | M |
| 18 | Rauens wing. | 5.19 | M | 18 | 4.19 | M | 18 | 3.19 | M | 18 | 2.19 | M |
| 19 | Virgins spike. | 5.51 | M | 19 | 4.51 | M | 19 | 3.51 | M | 19 | 2.51 | M |
| 20 | Twirt Bootes thighs. | 5.56 | M | 20 | 4.56 | M | 20 | 3.56 | M | 20 | 2.56 | M |
| 21 | South balance. | 7.16 | M | 21 | 6.16 | M | 21 | 5.16 | M | 21 | 4.16 | M |
| 22 | North balance. | 7.33 | ML | 22 | 6.33 | M | 22 | 5.33 | M | 22 | 4.33 | M |
| 23 | Scorpions heart. | 8.54 | MD | 23 | 7.54 | MD | 23 | 6.54 | M | 23 | 5.54 | M |
| 24 | Hercules head. | 9.14 | MI | 24 | 8.14 | MD | 24 | 7.14 | MD | 24 | 6.14 | M |
| 25 | Serpents head. | 9.41 | MD | 25 | 8.41 | MD | 25 | 7.41 | MI | 25 | 6.41 | M |
| 26 | The Eagle. | 12.19 | DA | 26 | 11.19 | MD | 26 | 10.19 | ML | 26 | 9.19 | MD |
| 27 | Dolphins tayle. | 1.12 | DA | 27 | 12.12 | DA | 27 | 11.12 | MI | 27 | 10.12 | MD |
| 28 | Goates tayle. | 1.48 | DA | 28 | 12.48 | DA | 28 | 11.48 | MI | 28 | 10.48 | MD |
| 29 | Water pourers leg. | 2.48 | DA | 29 | 1.48 | DA | 29 | 12.48 | DA | 29 | 11.48 | MD |
| 30 | Pegasus shoulder, | 3.47 | DA | 30 | 2.47 | DA | 30 | 1.47 | DA | 30 | 12.47 | DA |
| 31 | Pegasus legge. | 4.12 | DA | 31 | 3.12 | DA | 31 | 2.12 | DA | 31 | 1.12 | DA |
| 32 | Whales tayle. | 4.24 | DA | 32 | 3.24 | DA | 32 | 2.24 | DA | 32 | 1.24 | DA |

# A Table of the fixed Starres.

| March from the first to the. 15. | | | March from the 15. to the last. | | | April from the first day of the. 15 | | | April from the 15. day to the last | | | May from the first to the. 15. | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 1.20 | DA | 1 | 12 20 | DA | 1 | 11.20 | MD | 1 | 10.20 | MD | 1 | 9.20 | MD |
| 2 | 1.54 | DA | 2 | 12.54 | DA | 2 | 11.54 | MD | 2 | 10.54 | MD | 2 | 9.54 | MD |
| 3 | 2.28 | DA | 3 | 1.28 | DA | 3 | 12 28 | DA | 3 | 11.28 | MD | 3 | 10.28 | MD |
| 4 | 2.45 | DA | 4 | 1.45 | DA | 4 | 12 45 | DA | 4 | 11.45 | MD | 4 | 10.45 | MD |
| 5 | 4.52 | DA | 5 | 3.52 | DA | 5 | 2.52 | DA | 5 | 1.52 | DA | 5 | 12.52 | DA |
| 6 | 5.23 | DA | 6 | 4.23 | DA | 6 | 3.23 | DA | 6 | 2.23 | DA | 6 | 1.23 | DA |
| 7 | 5.28 | DA | 7 | 4 28 | DA | 7 | 3 28 | DA | 7 | 2.28 | DA | 7 | 1.28 | DA |
| 8 | 5.50 | DA | 8 | 4.50 | DA | 8 | 3.50 | DA | 8 | 2.50 | DA | 8 | 1.50 | DA |
| 9 | 6.12 | E | 9 | 5.12 | DA | 9 | 4.12 | DA | 9 | 3.12 | DA | 9 | 2.12 | DA |
| 10 | 7.4 | E | 10 | 6.4 | DA | 10 | 5.4 | DA | 10 | 4 4 | DA | 10 | 3 4 | DA |
| 11 | 8.0 | E | 11 | 7.0 | E | 11 | 6.0 | DA | 11 | 5.0 | DA | 11 | 4.0 | DA |
| 12 | 8.4 | E | 12 | 7.4 | E | 12 | 6.4 | DA | 12 | 5.4 | DA | 12 | 4.4 | DA |
| 13 | 10.12 | E | 13 | 9.12 | E | 13 | 8.12 | E | 13 | 7.12. | DA | 13 | 6 12 | DA |
| 14 | 10.13 | E | 14 | 9.13 | E | 14 | 8.13 | E | 14 | 7.13. | DA | 14 | 6.13 | DA |
| 15 | 11.0 | E | 15 | 10.0 | E | 15 | 9.0 | E | 15 | 8.0 | E | 15 | 7.0 | DA |
| 16 | 11.42 | E | 16 | 10.42 | E | 16 | 9.42 | E | 16 | 8.42 | E | 16 | 7.42 | DA |
| 17 | 1.2 | M | 17 | 12.2 | M | 17 | 11.2 | E | 17 | 10.2 | E | 17 | 9.2 | E |
| 18 | 1.19 | M | 18 | 12.19. | M | 18 | 11.19 | E | 18 | 10.19 | E | 18 | 9.19 | E |
| 19 | 1.51 | M | 19 | 12.51 | M | 19 | 11.51 | E | 19 | 10.51 | E | 19 | 9.51 | E |
| 20 | 1.56 | M | 20 | 12.56 | M | 20 | 11.56 | E | 20 | 10.56 | E | 20 | 9.56 | E |
| 21 | 3.16 | M | 21 | 2.16 | M | 21 | 1.16 | M | 21 | 12.16 | M | 21 | 11.16 | E |
| 22 | 3.33 | M | 22 | 2.33 | M | 22 | 1.33 | M | 22 | 12.33. | M | 22 | 11.33 | E |
| 23 | 4.54 | M | 23 | 3.54 | M | 23 | 2.54 | M | 23 | 1.54 | M | 23 | 12.54 | M |
| 24 | 5.14 | M | 24 | 4 14 | M | 24 | 3.14 | M | 24 | 2.14 | M | 24 | 1.14 | M |
| 25 | 5.41 | M | 25 | 4.41 | M | 25 | 3 41 | M | 25 | 2.41 | M | 25 | 1.41 | M |
| 26 | 8.19 | MD | 26 | 7.19 | MD | 26 | 6.19 | MD | 26 | 5.19 | MD | 26 | 4.19 | M |
| 27 | 9.12 | MD | 27 | 8.12 | MD | 27 | 7.12 | MD | 27 | 6.12 | MD | 27 | 5.12 | MD |
| 28 | 9.48 | MD | 28 | 8.48 | MD | 28 | 7.48 | MD | 28 | 6.48 | MD | 28 | 5.48. | MD |
| 29 | 10.48 | MD | 29 | 9.48 | MD | 29 | 8.48 | MD | 29 | 7.48 | MD | 29 | 6 48 | MD |
| 30 | 11.47 | MD | 30 | 10.47 | MD | 30 | 9.47 | MD | 30 | 8.47 | MD | 30 | 7.47 | MD |
| 31 | 12,12 | DA | 31 | 11.12 | MD | 31 | 10.12 | MD | 31 | 9.12 | MD | 31 | 8.12 | MD |
| 32 | 12.24 | DA | 32 | 11.24. | DM | 32 | 10 24 | MD | 32 | 9.24 | MD | 32 | 8.24 | MD |

# A Table of the fixed Starres

| May from the 15. day to the last | | | June from the first to the 15. | | | June from 15. day to the last. | | | July from the first to the 15. | | | July from 15. day to the last. | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 8.20 | MD | 1 | 7.20 | MD | 1 | 6.20 | MD | 1 | 5.20 | MD | 1 | 4.20 | M |
| 2 | 8.54 | MD | 2 | 7.54 | MD | 2 | 6.54 | MD | 2 | 5.54 | MD | 2 | 4.54 | MD |
| 3 | 9.28 | MD | 3 | 8.28 | MD | 3 | 7.28 | MD | 3 | 6.28 | MD | 3 | 5.28 | MD |
| 4 | 9.45 | MD | 4 | 8.45 | MD | 4 | 7.45 | MD | 4 | 6.45 | MD | 4 | 5.45 | MD |
| 5 | 11.52 | MD | 5 | 10.52 | MD | 5 | 9.52 | MD | 5 | 8.52 | MD | 5 | 7.52 | MD |
| 6 | 12.23 | DA | 6 | 11.23 | MD | 6 | 10.23 | MD | 6 | 9.23 | MD | 6 | 8.23 | MD |
| 7 | 12.28 | DA | 7 | 11.28 | MD | 7 | 10.28 | MD | 7 | 9.28 | MD | 7 | 8.28 | MD |
| 8 | 12.50 | DA | 8 | 11.50 | MD | 8 | 10.50 | MD | 8 | 9.50 | MD | 8 | 8.50 | MD |
| 9 | 1.12 | DA | 9 | 12.12 | DA | 9 | 11.12 | MD | 9 | 10.12 | MD | 9 | 9.12 | MD |
| 10 | 2.4 | DA | 10 | 1.4 | DA | 10 | 12.4 | DA | 10 | 11. 4 | MD | 10 | 10.4 | MD |
| 11 | 3.0 | DA | 11 | 2.0 | DA | 11 | 1.0 | DA | 11 | 12.0 | | 11 | 11.0 | MD |
| 12 | 3.4 | DA | 12 | 2.4 | DA | 12 | 1.4 | DA | 12 | 12.4 | DA | 12 | 11.4 | MD |
| 13 | 5.12 | DA | 13 | 4.12 | DA | 13 | 3.12 | DA | 13 | 2.12 | DA | 13 | 1.12 | DA |
| 14 | 5.13 | DA | 14 | 4.13 | DA | 14 | 3.13 | DA | 14 | 2.13 | DA | 14 | 1.13 | DA |
| 15 | 6.0 | DA | 15 | 5.0 | DA | 15 | 4.0 | DA | 15 | 3.0 | DA | 15 | 2.0 | DA |
| 16 | 6.42 | DA | 16 | 5.42 | DA | 16 | 4.42. | DA | 16 | 3.42 | DA | 16 | 2.42 | DA |
| 17 | 8.2 | DA | 17 | 7.2 | DA | 17 | 6.2 | DA | 17 | 5.2 | DA | 17 | 4.2 | DA |
| 18 | 8.19 | DA | 18 | 7.19 | DA | 18 | 6.19 | DA | 18 | 5.19 | DA | 18 | 4.19 | DA |
| 19 | 8.51 | DA | 19 | 7.51 | DA | 19 | 6.51 | DA | 19 | 5.51 | DA | 19 | 4.51 | DA |
| 20 | 8.56 | DA | 20 | 7.56 | DA | 20 | 6.56 | DA | 20 | 5.56 | DA | 20 | 4.56 | DA |
| 21 | 10.16 | E | 21 | 9.16 | DA | 21 | 8.16 | DA | 21 | 7.16 | DA | 21 | 6.16 | DA |
| 22 | 10.33 | E | 22 | 9.33 | DA | 22 | 8.33 | DA | 22 | 7.33 | DA | 22 | 6.33 | DA |
| 23 | 11.54 | E | 23 | 10.54 | E | 23 | 9.54 | DA | 23 | 8.54 | DA | 23 | 7.54 | DA |
| 24 | 12.14 | M | 24 | 11.14 | E | 24 | 10.14 | E | 24 | 9.14 | E | 24 | 8.14 | E |
| 25 | 12.41 | M | 25 | 11.41 | E | 25 | 10.41 | E | 25 | 9.41 | E | 25 | 8.41 | E |
| 26 | 3.19 | M | 26 | 2.19 | M | 26 | 1.19 | M | 26 | 12.19 | M | 26 | 11.19 | E |
| 27 | 4.12 | MD | 27 | 3.12 | M | 27 | 2.12 | M | 27 | 1.12 | M | 27 | 12.12 | M |
| 28 | 4.48 | MD | 28 | 3.48 | M | 28 | 2.48 | M | 28 | 1.48 | M | 28 | 12.48 | M |
| 29 | 5.48 | MD | 29 | 4.48 | MD | 29 | 3.48 | M | 29 | 2.48 | M | 29 | 1.48 | M |
| 30 | 6.47 | MD | 30 | 5.47 | MD | 30 | 4.47 | MD | 30 | 3.47 | M | 30 | 2.47 | M |
| 31 | 7.12 | MD | 31 | 6.12 | MD | 31 | 5.12 | MD | 31 | 4.12 | MD | 31 | 3.12 | M |
| 32 | 7.24 | MD | 32 | 6.24 | MD | 32 | 5.24 | MD | 32 | 4.24 | MD | 32 | 3.24 | M |

# A Table of the fixed Starres.

| August from ye first to the. 15. | | | August from the 15. day to ye last. | | | September from ye 1. unto ye. 15. day. | | | September from ye 15. to ye last day. | | | October from the 1. to the. 15. day. | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 3.20 | M | 1 | 2.20 | M | 1 | 1.20 | M | 1 | 12.20 | M | 1 | 11.20 | E |
| 2 | 3.54 | M | 2 | 2.54 | M | 2 | 1.54 | M | 2 | 12.54 | M | 2 | 11.54 | E |
| 3 | 4.28 | M | 3 | 3.28 | M | 3 | 2.28 | M | 3 | 1.28 | M | 3 | 12.28 | M |
| 4 | 4.45 | MD | 4 | 3.45 | M | 4 | 2.45 | M | 4 | 1.45 | M | 4 | 12.45 | M |
| 5 | 6.52 | MD | 5 | 5.52 | MD | 5 | 4.52 | M | 5 | 3.52 | M | 5 | 2.52 | M |
| 6 | 7.23 | MD | 6 | 6.23 | MD | 6 | 5.23 | M | 6 | 4.23 | M | 6 | 3.23 | M |
| 7 | 7.28 | MD | 7 | 6.28 | MD | 7 | 5.28 | M | 7 | 4.28 | M | 7 | 3.28 | M |
| 8 | 7.50 | MD | 8 | 5.50 | MD | 8 | 5.50 | MD | 8 | 4.50 | M | 8 | 3.50 | M |
| 9 | 8.12 | MD | 9 | 7.12 | MD | 9 | 6.12 | MD | 9 | 5.12 | M | 9 | 4.12 | M |
| 10 | 9.4 | MD | 10 | 8.4 | MD | 10 | 7.4 | MD | 10 | 6.4 | MD | 10 | 5.4 | M |
| 11 | 10.0 | MD | 11 | 9.0 | MD | 11 | 8.0 | MD | 11 | 7.0 | MD | 11 | 6.0 | M |
| 12 | 10.4 | MD | 12 | 9.4 | MD | 12 | 8.4 | MD | 12 | 7.4 | MD | 12 | 6.4 | M |
| 13 | 12.12 | DA | 13 | 11.12 | MD | 13 | 10.12 | MD | 13 | 9.12 | MD | 13 | 8.12 | MD |
| 14 | 12.13 | DA | 14 | 11.13 | MD | 14 | 10.13 | MD | 14 | 9.13 | MD | 14 | 8.13 | MD |
| 15 | 1.0 | DA | 15 | 12.0 | | 15 | 11.0 | MD | 15 | 10.0 | MD | 15 | 9.0 | MD |
| 16 | 1.42 | DA | 16 | 12.42 | DA | 16 | 11.42 | MD | 16 | 10.42 | MD | 16 | 9.42 | MD |
| 17 | 3.2 | DA | 17 | 2.2 | DA | 17 | 1.2 | DA | 17 | 12.2 | DA | 17 | 11.2 | MD |
| 18 | 3.19 | DA | 18 | 2.19 | DA | 18 | 1.19 | DA | 18 | 12.19. | DA | 18 | 11.19 | MD |
| 19 | 3.51 | DA | 19 | 2.51 | DA | 19 | 1.51 | DA | 19 | 12.51 | DA | 19 | 11.51 | MD |
| 20 | 3.56 | DA | 20 | 2.56 | DA | 20 | 1.56 | DA | 20 | 12.56 | DA | 20 | 11.56 | MD |
| 21 | 5.16 | DA | 21 | 4.16 | DA | 21 | 3.16 | DA | 21 | 2.16 | DA | 21 | 1.16 | DA |
| 22 | 5.33 | DA | 22 | 4.33 | DA | 22 | 3.33 | DA | 22 | 2.33 | DA | 22 | 1.33 | DA |
| 23 | 6.54 | DA | 23 | 5.54 | DA | 23 | 4.54 | DA | 23 | 3.54 | DA | 23 | 2.54 | DA |
| 24 | 7.14 | DA | 24 | 6.14 | DA | 24 | 5.14 | DA | 24 | 4.14 | DA | 24 | 3.14 | DA |
| 25 | 7.41 | DA | 25 | 6.41 | DA | 25 | 5.41 | DA | 25 | 4.41 | DA | 25 | 3.41 | DA |
| 26 | 10.19 | E | 26 | 9.19 | E | 26 | 8.19 | E | 26 | 7.19 | E | 26 | 6.19 | E |
| 27 | 11.12 | E | 27 | 10.12 | E | 27 | 9.12 | E | 27 | 8.12 | E | 27 | 7.12 | E |
| 28 | 11.48 | E | 28 | 10.48 | E | 28 | 9.48 | E | 28 | 8.48 | E | 28 | 7.48 | E |
| 29 | 12.48 | M | 29 | 11.48 | E | 29 | 10.48 | E | 29 | 9.48 | E | 29 | 8.48 | E |
| 30 | 1.47 | M | 30 | 12.47 | M | 30 | 11.47 | E | 30 | 10.47 | E | 30 | 9.47 | E |
| 31 | 2.12 | M | 31 | 1.12 | M | 31 | 12.12 | M | 31 | 11.12 | E | 31 | 10.12 | E |
| 32 | 2.24 | M | 32 | 1.24 | M | 32 | 12.24 | M | 32 | 11.24 | E | 32 | 10.24 | E |

October

# A Table of the fixed Starres

| October from ye 15. day to the last | | | November from ye first to the 15. | | | November the 15. day to the last | | | December from ye first to the 15. | | | December from ye 15. to the last | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 10.20 | E | 1 | 9.20 | E | 1 | 8.20 | E | 1 | 7.20 | E | 1 | 6.20 | E |
| 2 | 10.54 | E | 2 | 9.54 | E | 2 | 8.54 | E | 2 | 7.54 | E | 2 | 6.54 | E |
| 3 | 11.28 | E | 3 | 10.28 | E | 3 | 9.28 | E | 3 | 8.28 | E | 3 | 7.28 | E |
| 4 | 11.45 | E | 4 | 10.45 | E | 4 | 9.45 | E | 4 | 8.45 | E | 4 | 7.45 | E |
| 5 | 1.52 | M | 5 | 12.52 | M | 5 | 11.52 | E | 5 | 10.52 | E | 5 | 9.52 | E |
| 6 | 2.23 | M | 6 | 1.23 | M | 6 | 12 23 | M | 6 | 11.23 | E | 6 | 10.23 | E |
| 7 | 2.28 | M | 7 | 1 28 | M | 7 | 12.28 | M | 7 | 11.28 | E | 7 | 10.28 | E |
| 8 | 2.50 | M | 8 | 1.50 | M | 8 | 12 50 | M | 8 | 11.50 | E | 8 | 10.50 | E |
| 9 | 3.12 | M | 9 | 2.12. | M | 9 | 1.12 | M | 9 | 12.12 | M | 9 | 11.12 | E |
| 10 | 4.4 | M | 10 | 3.4 | M | 10 | 2.4 | M | 10 | 1 4 | M | 10 | 12.4 | M |
| 11 | 5.0 | M | 11 | 4.0 | M | 11 | 3.0 | M | 11 | 2.0 | M | 11 | 1.0 | M |
| 12 | 5.4 | M | 12 | 4 4 | M | 12 | 3 4 | M | 12 | 2.4 | M | 12 | 1.4 | M |
| 13 | 7.12 | MD | 13 | 6.12 | M | 13 | 5 12 | M | 13 | 4.12 | M | 13 | 2 12 | M |
| 14 | 7.13 | MD | 14 | 6 13 | M | 14 | 5.13 | M | 14 | 4.13 | M | 14 | 2.13 | M |
| 15 | 8.0 | MD | 15 | 7.0 | M | 15 | 6.0 | M | 15 | 5.0 | M | 15 | 4.0 | M |
| 16 | 8.42 | MD | 16 | 7.42 | MD | 16 | 6.42 | M | 16 | 5.42 | M | 16 | 4.42. | M |
| 17 | 10.2 | MD | 17 | 9.2 | MD | 17 | 8.2 | MD | 17 | 7.2 | M | 17 | 6.2 | M |
| 18 | 10.19 | MD | 18 | 9.19 | MD | 18 | 8.19 | MD | 18 | 7.19 | M | 18 | 6.19 | M |
| 19 | 10.51 | MD | 19 | 9.51 | MD | 19 | 8.51 | MD | 19 | 7.51 | MD | 19 | 6.51 | M |
| 20 | 10.56 | MD | 20 | 9.56 | MD | 20 | 8.56 | MD | 20 | 7.56 | MD | 20 | 6.56 | M |
| 21 | 12.16 | DA | 21 | 11.16 | MD | 21 | 10.16 | MD | 21 | 9.16 | MD | 21 | 8.16 | MD |
| 22 | 12 33 | DA | 22 | 11.33 | MD | 22 | 10.33 | MD | 22 | 9.33 | MD | 22 | 8.33 | MD |
| 23 | 1.54 | DA | 23 | 12.54 | DA | 23 | 11.54 | MD | 23 | 10.54 | MD | 23 | 9.54 | MD |
| 24 | 2.14 | DA | 24 | 1.14 | DA | 24 | 12.14 | DA | 24 | 11.14 | MD | 24 | 10.14 | MD |
| 25 | 2.41 | DA | 25 | 1 41 | DA | 25 | 12.41 | DA | 25 | 11.41 | MD | 25 | 10.41 | MD |
| 26 | 5.19 | DA | 26 | 4.19 | DA | 26 | 3.19 | DA | 26 | 2.19 | DA | 26 | 1.19 | DA |
| 27 | 6 12 | E | 27 | 5.12 | E | 27 | 4.12 | E | 27 | 3.12 | DA | 27 | 2.12 | DA |
| 28 | 6.48 | E | 28 | 5.48 | E | 28 | 4.48 | E | 28 | 3.48 | DA | 28 | 2.48 | DA |
| 29 | 7.48 | E | 29 | 6.48 | E | 29 | 5.48 | E | 29 | 4.48 | E | 29 | 3.48 | DA |
| 30 | 8.47 | E | 30 | 7.47 | E | 30 | 6.47 | E | 30 | 5.47 | E | 30 | 4 47 | E |
| 31 | 9.12 | E | 31 | 8.12 | E | 31 | 7.12 | E | 31 | 6.12 | E | 31 | 5.12 | E |
| 32 | 9.24 | E | 32 | 8.24 | E | 22 | 7.24 | E | 32 | 6.24 | E | 32 | 5.24 | E |

The

Wherefore it is a plaine case, that the Earth and Sea is not flat, but circular, as is afore declared. &c.

## ¶ The. 19. Chapter, is as touching the making of Plats or Cardes for the Sea, and not to paint their cards as they do, but rather to supply the vacant places with other necessarie matters: & also of three necessarie things contained in the plats or cardes, and their vses, which is the most necessarie thing in Nauigation.

FOr the making of Plats or Cards, as touching Hydrographia cõmonly called sea Cards, I meane to say litle therof: for that it is sufficiently declared in the booke called the art of Nauigation: Saying this, I would wish thẽ that be the makers of plats and cardes for the Sea, not to paint their compasses with so many colours: neither vpon the Lande with so many flagges, for that it dothe rather hurte than good: although it may be saide they be so painted in vacant places, those vacant places I would wish them to furnish with these 2. matters in this order. Firste in some vacant place with a compasse there, to place against euery point of the half of the compasse, letters, or some other figures or caracters, then in like maner, (according to that place where suche a Wone maketh a full Sea) to make that letter or caracter at the hauen, port, or place. As for ensample thus: I place A at the East point, B at the East and by South, C at the East southeast, D at Southeast and by East, and so consequently to all the pointes vnto the Weast, then that being done, where it floweth an Easte Wone, I place A in the platte or carde, and where an Easte and by South Wone, I doe place B in the carde, and so forthe, according to the place of the Wone that maketh a full Sea. And where it runneth halfe tyde vnder

Not to paint their Sea cards but to vse y vacant places with other necessary matters.

other, to make some note vpon the poynt of the compasse. &c.

To draw ye shape of the lād in their cardes.

This also is very necessarie to be done to furnishe vp all the vacant places of the plat or carde, to drawe the shape or fashion of euery headland or high lande alongst euery coast that is needefull to be knowne, and at what poynte of the compasse the lande is of that fashion: at howe farre off the lande ryseth in that fashion: and so to make the fashion of the lande as often as the lande altereth the forme and fashion: and last of all, at what poynte of the compasse the lande bathe that shape or fashion: for being vpon one side, the lande ryseth of one fashion, and on the other side of an other forme or fashion. Also being neare the lande it will be in one fashion, and being far off in an other fashion (as is before declared in the 14. Chapter) for there is nothing more needefull and necessary for a Seaman, than this: to knowe the lande when he seeth it, and there is no way better to make him remember it, than to haue notes howe the lande dothe rise vpon euery side: and what greater inconuenience may there growe by any meanes, than there may by mistaking of a place? for it were twentie times better to be throughly persuaded that he knoweth it not, than to thinke he doth knowe it not being that place. For whereas he doth thinke to preuent the dangers, he may willingly runne vpon the dangers not known of him. Therefore in my opinion they can do no better than to furnish their vacant places in their plats and cards with this matter: for there can be nothing better. The vse of the Sea cardes is most necessary for Nauigation for long voyages: fyrste for that it sheweth you howe one place beareth from another: secondly, the distance of any places howe farre the one is from the other. Of whiche the one is represented by the lines of the compasse: the other by the scale or trunke of measure, if the platte be truely made. Thirdly, it sheweth you in what Latitude from the Equinoctiall or Altitude of the pole any place is in, by the line of degrees. How to directe youre course through the Sea by the carde to any

Great infirmities by mistaking any place.

How necessary a thing the sea cardes be.

3. necessarie things in ye sea cardes.

place

place assigned, you must first loke by what poynte of the cõ-
passe it beareth from you, from the place you meane to setts
off from the lande, vnto the place you would fyrst fall with.
Which you shall know thus: seke alyne from the nert com-
passe vnto the place you meane to depart frõ, then open your
compasses vnto one of those lynes by your iudgement that
falleth neare vnto your place assigned: and let the other foote
of your compasses stande iust at that place where your ship
is, when you direct your course: that done, beare your hands
forwardes euen, and let the one ende be still vpon the lyne to
the whiche you did open your compasses, vntill you come to
your place assigned. But if it falleth short of the place assig-
ned, then take the nerte line nearer vnto the place you de-
parted from; when you haue so done, if your compasses doe
ouer reache the place assigned, then take a lyne further off
from the place you doe meane to set off from: and so shall you
see by what poynte of the compasse the place assigned dothe
beare from you. &c. If you would knowe howe farre the place
assigned is from you, set the one foote of the compasses vpon
the place you departe from, and stretche out the other foote
vnto the place assigned iuste, that done (standing still vnre-
moued) sette them to the scale or trunke of measure, and that
wil shewe you iustly how many leagues it is iust frõ the place
of your departing vnto the place assigned. If the distance be-
tween the. 2. places be more than the compasses will reach at
once, then first set your compasses vnto the scale, opening the
compasses vnto. 100. leagues more or lesse, as your scale and
cõpasses will giue you leane at your discretion, after that set
yone foot at the place of your departing, & the other foot of the
cõpasses right towards the place assigned, as oftẽ times as ỹ
distance betwen the. 2. places doth require, & thereof (the cõ-
passes being opened vnto. 100. leagues) you may cõclude it to
be so many. 100. leag. vnto the place assigned as the cõpasses
did shew vnto you: but if ther be any od mesure, thẽ ope your
cõpasses to ỹ quãtity, & set to thẽ ỹ scale, & it wil shew you ỹ

To knowe howe any place dothe beare from you by the carde.

To knowe howe far it is vnto any place by the carde.

iuſt contente of that meaſure, more than ſo many. 100. leagues. &c. Furthermore touching the third commoditie, which is to knowe what Latitude any place aſſigned hath: ſet one foote of the compaſſes vpon the place aſſigned, and open the compaſſes vnto the nexte Eaſte and Weaſt line, then carie that vnto the line of degrees (keeping the foote of the compaſſes vpon the Eaſte and Weaſt lyne) it will ſhewe iuſtly the number of degrees that the Pole is aboue the Horizon. So of theſe three wayes, by the firſt is knowne by what poynt of the compaſſe any place beareth from you. By the ſeconde is knowne howe farre diſtance it is vnto any place aſſigned. And by the thirde is knowne in what heigth the Pole is in any place aſſigned. &c. Nowe (this being knowne) you maye with the more eaſe knowe howe to attaine to come vnto the port or place aſſigned. Yet furthermore, there is to be conſidered (in directing the courſe of a ſhip to any place aſſigned) what impediments may be by the way: as tydes, currents, or the ſcantneſſe of the wynde whiche may put the ſhip vnto the leewardes of his courſe, as alſo the ſurging of the Sea: And all this muſte be conſidered by the maiſter and Pilot of the ſhip. Likewiſe alſo in long voyages, the winde may ofte ſhifte vpon him, and ſometime the winde may be ſuch as he can not lye his courſe: wherefore he muſt keepe a perfite account of the ſhips way, and conſider to knowe what point the ſhip hath made hir way good by. And at euery time that the wynde doth ſhifte, and the ſhip can not lye hir courſe, to note in the carde or plat in what place the ſhip may be: in hauing a ſpeciall regarde vnto the way of the ſhip, as touching the ſwiftneſſe or ſlowneſſe that the ſhippe goeth: and if ſo be the weather be cleare either by night or by day, to take the true Altitude of the Pole: for by that they may correcte the ſhips way, and giue a very neare geſſe howe the place (aſſigned to go vnto) doth bear from them, as alſo how farre it is thither, ſauing onely in the Eaſte and Weaſt courſe: and then they haue no other helpe but only the very account of the ſhippes way:

To knowe what Latitude or heigth of ſ Pole any place hath by the carde.

Things to be cõſidered by the M. or pilote of a ſhip.

They may correct the ſhips waye by the taking ſ heigth of the Pole.

way. And to correct their deade reckning by the altitude of the Pole they muſt do this: (eſpecially if the ſhippe haue had often trauerſe by the meanes of contrary winds, ſo that ſhe could not lie hir courſe) conſider vpon the carde or plat how long the ſhip hath made hir way good for ſo many points as the ſhip hath ſayld by: then (if by the altitude of the Pole the ſhippe hathe gone more than the dead reckning did ſhewe you) repaire vnto the line of degrees, and ſet the one foote of the compaſſes vpon the degree and place of the heigth of the Pole, and the other vpon the next eaſt and weſt lyne: that done, bear it vnto the place you ſuppoſe the ſhippe to be in: & thē bring forwards with the other compaſſes, what point of the Compas the ſhippe hath ſayled by, and at the meeting of the .2. paire of compaſſes make a note for the place that the ſhippe is in: from which place you may with your compaſſes ſee, how the place aſſigned dothe beare, and alſo how farre off you be from the ſame. Furthermore (if you find by the heigth of the Pole that you are not ſo farre ſhot as your reckning did ſhewe vnto you) you muſt pull backe ſo much from the point that the ſhippe hath ſayled by, as the heigth of the pole doth ſhew vnto you, by the order before reherſed &c. Furthermore (as I. haue declared vnto you in the .14. Chapter going before) to knowe howe farre the land is off from you, knowing (as before) the diſtaunce betweene any .2. places by ſetting the land with your compas, you may do the like by your card, as thus: you ſetting the .2. places with your compaſſe, do know that the .2. places be ſo many leagues aſunder, then ſhall you repaire to the card, and according to the bearing of the .2. places by the points of the compas, you (being thwart of one of theſe .2. places) ſhall reple it with your compaſſes vnto your ſcale: But for that in the ſcale the leagues be ſo ſmall, you may aſſigne .20. leagues to be but one league, and open the compaſſes vnto that proportion that the .2. places be aſunder, and the one of them doth beare from the other: that done, open the compaſſes a-

To knowe howe far the lande is of from you by the ſight of the lande with youre compaſſe, & to do it vpon the land.

gaine from the center of the compas vnto the place that you do imagin to be the land, and then reply it vnto the trunk of measure, you shall see howe many leagues you bee from the shore and so forth. So that you may see that the plat or card is one of the necessariest things that is to be vsed in Nauigation. &c.

## ¶ The .20. Chapiter is of the Longitude and declinatiõ of .32. notable fixed Starres for Nauigation, with tables of their shining, and at what pointe of your compas they do both rise and set: and also tables for euery moneth of the yeere, declaring at what houre and minute they be South, running from the first day of the moneth to the .15. and from the .15. to the last day, and will continue these 100. yeares without muche error.

AND furthermore I do thinke it conuenient for diuerse considerations to shew the Longitude and declination of certaine of the most notablest fixed Starres that are neere vnto the Equinoctiall, to the number of .32. of them, whiche are very necessary for Nauigation in diuers respectes, as this: if you be vnto the North parts where the North pole is raysed more than .50. degr. 60. degrees, then the North Starre is too hye to be obserued or taken with the crosse staffe (as I haue declared in the .6. Chapter) and it may chaunce so that in the day the Sunne is not to be seene at noone, and then these Starres may serue your turne. And furthermore they be very good for them that haue occasion to trauell beyonde the Equinoctiall where the North pole is vnder the Horizon, in vsing their declination as they do the Sunnes declination in all points, whiche doth appeare in the .7. .8. and .9. Chapters of this booke. And furthermore they be very necessary for Seafaring men to knowe the houre of the night: both

If the pole be raysed more than 50. 02. 60. degrees, it is to hye to be obserued by ỹ crosse staffe. These Starres will serue beyond the Equinoctiall.

both by their being vpon the Meridian, and also by their rising and setting: you may know the true time of their rising and setting in euery Latitude by their declination from the Equinoctiall, whether they decline to the South partes or North parts, as is declared by the declination of the Sun in the.11.chapter. And furthermore by any of these Starres you may trie the variatiō of your compas by night. &c. Now shal folow the table of all these Stars. The first row of this table conteineth the names of the Stars The seconde, the signes, that they be in Longitude. The thirde, the degrees in the signes. The. 4. the minutes belonging therevnto. The. 5. the degrees of declination. The. 6. the odde minuts belonging therevnto. The. 7. sheweth towardes what port they decline by letters, of whiche S. signifieth Septentrionell or North declination. M. signifieth Meridionall or south declination: as in the table doth appeare. The. 8 doth shew nothing but the bigneſſe of the Starres. Now followeth the Table.

To knowe the rising and setting of these Starres in all places by the order of the 21. Chapter The order of the table following.

# A Table of the fixed Starres.

| The names of the Starres. | Signes. | Longit. degr. mi. | Declin. deg. mi. | To what par. they decline. | | Bigneſſe of the ſtarres |
|---|---|---|---|---|---|---|
| Whales backe. | Aries. | 6. 6 | 12. 11. | M | | ſecond bigneſſe |
| Whales belly. | Aries. | 16. 2 | 12. 20 | M | | ſecond bigneſſe |
| Rammes horne. | Aries. | 27. 42 | 17. 19 | S | | thirde bigneſſe |
| Rammes head. | Taurus. | 1. 46 | 21. 16 | S | | thirde bigneſſe |
| Bulles eye. | Gemini. | 3. 42 | 15. 42 | S | | great Starres |
| Orions left foote. | Gemini. | 10. 12 | 9. 14 | M | | a great Starre |
| Orions left ſhoulder. | Gemini. | 11. 26 | 4. 37 | S | | a Starre of the |
| Firſt Orions girdle. | Gemini. | 16. 22 | 1. 19 | M | | ſecond light both |
| Orions right ſhoulder | Gemini. | 23. 6 | 6. 18 | S | | a great Starre |
| Great Dogge. | Cancer. | 8. 40 | 15. 30 | M | | a very great ſtar |
| Leſſer Dogge. | Cancer. | 20. 10 | 6. 4 | S | | a great Starre |
| Brighteſt in *Hydra*. | Leo. | 21. 2 | 4. 47 | M | | ſecond bigneſſe |
| Lyons necke. | Leo. | 23. 16 | 21. 59 | S | | ſecond bigneſſe |
| Lyons heart. | Leo. | 23. 32 | 14. 3 | S | | a great Starre |
| Lyons backe. | Virgo. | 5. 16 | 22. 30 | S | | ſecond bigneſſe |
| Lyons tayle. | Virgo. | 15. 32 | 16. 46 | S | | a great Starre |
| Ravens head. | Libra. | 5. 6 | 19. 53 | M | | of the thirde big- |
| Ravens wing. | Libra. | 9. 36 | 17. 8 | M | | neſſe both thoſe |
| Virgins ſpike. | Libra. | 17. 42 | 4. 54 | M | | a great Starre |
| Thwart Footes thighs. | Libra. | 18. 6 | 22. 9 | S | | a great Starre |
| South balance. | Scorpio. | 9. 2 | 13. 44 | M | | ſecond bigneſſe |
| North balance. | Scorpio. | 13. 12 | 7. 33 | M | | ſecond bigneſſe |
| Scorpions heart. | Sagittari | 3. 42 | 24. 47 | M | | ſecond bigneſſe |
| Hercules head. | Sagittari. | 8. 42 | 15. 20 | S | | thirde bigneſſe |
| Serpents head. | Sagittari. | 15. 52 | 14. 7 | S | | thirde bigneſſe |
| The Eagle. | Capricor | 24. 51 | 7. 28 | S | | ſecond bigneſſe |
| Delphins tayle. | Aquari. | 8. 27 | 10. 1 | S | | thirde bigneſſe |
| Ceatus tayle. | Aquari. | 17. 22 | 14. 13 | M | | thirde bigneſſe |
| Water pourers leg. | Piſces. | 2. 20 | 15. 52 | M | | thirde bigneſſe |
| Pegaſus ſhoulder. | Piſces. | 17. 41 | 13. 1 | S | | ſecond bigneſſe |
| Pegaſus legge. | Piſces. | 23. 10 | 26. 30 | S | | ſecond bigneſſe |
| Whales tayle. | Piſces. | 26. 21 | 21. 47 | M | | thirde bigneſſe |

The

NOw this table serueth for euery monthe in the yere (being exactly calculated) the time of their being South, or touching your Meridia or (as some terme it) Mones stead, serving very well the Seamen to take the heigth of them with their instruments vpon the Sea, referring it vnto the table of declination that goeth before: the first is the houres, the seconde the minutes, the third be the letters that shewe you whether they be South by day or by night, in the euening or morning, in the forenoone or after noone, of which the letter E. doth signifie Euening, the letter M. signifieth Morning, the letters DM. signifieth day in the Morning, and the letters DA. signifieth day in the after noone (as I sayde before) the very houre and minute of their being South. Nowe you se that I haue put to their being South in the day as well as in the nighte, to the intent to knowe the houre of the night as well by their setting, as also by your compasse, which I shewed you in the first chapter or rule, namely to bring your. 32. poyntes into 24. houres: and in like maner in the fourth chapter by shining of the Mone to diuide the shining into two equall partes, then those parts (being equally deuided with the houre & minutes) and the time before their being South, put togither, the halfe that shineth and that, sheweth the iust rising of those starres: and the other time of their shining after their being South, sheweth their setting (as I declared in the rule of the shining of the Mone.) Nowe you, seing the table runneth from the first day of euery monthe to the. 15. and from the. 15. to the last daye, muste consider (if you will knowe the exacte time betwixte the first day & the. 15. day, or betwixt the. 15. day, and the last) to do this, loke how many dayes of the monthe is passe eyther from the first day, or. 15. day, and pull foure minutes from that number: for so many days as is past, for euery day that shall shew you the true time of their being South. That knowne, you shall doe (as is afore sayde) for their rising and setting.

The significetion of the letters in the table.

M. The

## ¶ The. 21. Chapter sheweth you the making of a generall instrument, to know the houre of the day by, throughout all the worlde.

NOwe for the making of your instruments for the Sea, with their vses, you shall repayre to the booke of Nauigation made by Martin Curtise a Spaniarde, Imprinted by P. Iugge Printer to the Quenes Maiestie: else I would haue shewed you the making of diuers instruments, as also the making of the equinoctiall diall with his vse, whiche is very profitable to knowe the houre of the day by, in all latitudes through the whole worlde, for your compasse is not to knowe the houre of the day by in Sommer, neyther in the Morning nor Euening, neyther can you knowe when the Mone is east or West, she hauing North declination, as being in the signe of Taurus, Gemini, Cancer, or Leo: bicause your compasse standeth flatte as dothe your Horizon. Wherfore it is very good for Sea menne to vse the Equinoctiall dials, for that it sheweth them the true houre of the day in all Latitudes, and also the Mone dothe giue a true shadowe in that Diall in all Latitudes, for I doe knowe that Sea men are very many times deceyued where it dothe flowe an East and West Mone, or any poynt betweene the Southeast and Northeast. Bicause in setting the Mone with their compasse (being in the North signes) she seemeth to be East by the Compasse, when she is neare the East Southeast in hir course: and in like manner when the Mone seemeth West by the compasse she shall be a little more than West Southwest in hir course: which is a very perilious matter vnto them that should put into a tide, harborowe, or hauen, where he knoweth there is water inough for him if that he dothe come at a full Sea, and then by the error of the Mones shadowe of the compasse he is deceyued: and when he findeth the error he thinketh that the cause thereof commeth by the occasion

The sunne and moone doth giue a full shadow by the compasse.

The Equinoctiall diall giueth a true shadowe all the world ouer.

A perilous matter.

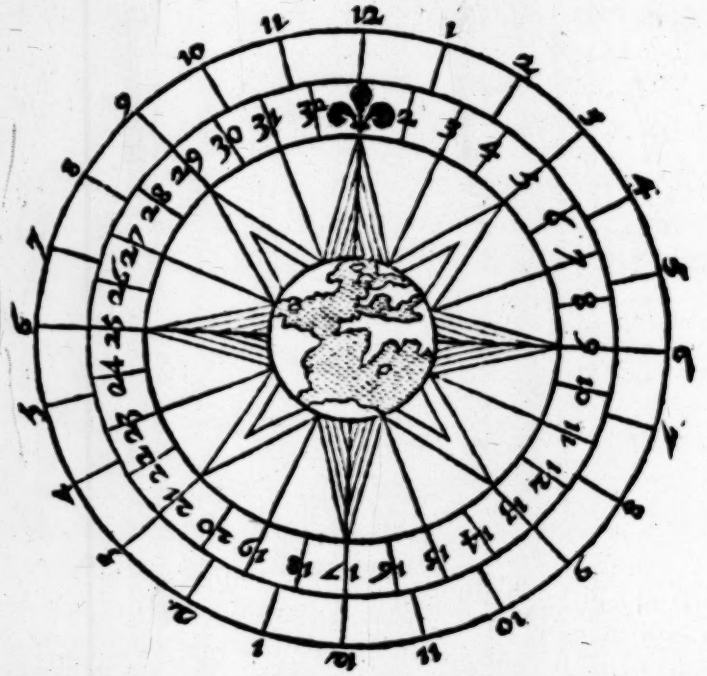
cation of some storme of wynde that is lyke to followe, imputing vnto it that the tyde dothe not kepe hys course, whereas the very cause groweth by no other meanes but of receyuing a false shadowe by the Horizontall compasse: and especially if the Mone be neare hir greatest declination vnto the North partes, that is, in the signe of Gemini and Cancer. And also that effect is most preferred if the Dragons head be in the beginning of the signe of Aries: for that then if the Mone be in the beginning of Cancer, she shall haue .5. degrees more in declination from the Equinoctiall, than the sunne shall haue at their greatest declination vnto the North partes: so that reseruing the Mones Paraler, which is according vnto the Latitude of any place that the Mone shal be declined .28. degrees and a halfe vnto the North part of the Equinoctiall: so that for auoyding of these infirmities, I wolde wishe them to vse the Equinoctiall dials. And furthermore I do thinke that the Equinoctiall dials be not vsed amongst our Mariners here in Englande for that the charges is so muche in the making of them, & yet it serueth no other turne but to know the houre of the day, & to shew the true shadowe of the Mone. I haue not knowne thē vsed by any English Maister or Pylot, but only by one man, which person had not it for the proper vse therof, but rather had it, to say that he had suche an instrument as no English man had the like, & to bragge that he had such an instrument that he could do great feates therewith in the going of long viages. &c. I would haue no men offended with me. I know the nature and qualitie of some that take charge: they will haue instruments & other things therunto apperteyning, & yet they thē selues do not know ẏ vse of thē, yet they will seme to be cunning, & that they nede no instructiōs of any man, for that they know all things, & yet in respect know nothing. (But notwithstanding) I would wish them that be Sea faring men to vse them selues to the Equinoctiall dials: for that they doe serue two notable turnes, as well at home in these our chanels, as also in long viages: they

The moone may decline 28. degrees and a halfe from the Equinoctiall.

Of me that will haue instruments, and knowe not the vse of them.

An eaſie waye to make an equinoctiall diall with little charge

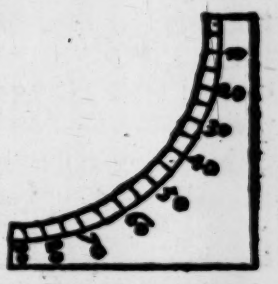
may make them with a very eaſie charge: for whereas in the Arte of Nauigation it is ſhewed howe to make them in braſſe, they may make them with wood in this manner: take a peece of boordes ende of fiue inches broad, more or leſſe at your diſcretion, and halfe an inche in thickneſſe, then hauing cutte it rounde, and playned it ſmoothe, you maye eyther graue in it the. 32. poyntes of the compaſſe, or elſe paynt them vpon it with ſome colours, with the. 24. houres vpon bothe the ſides: as this figure ſheweth.



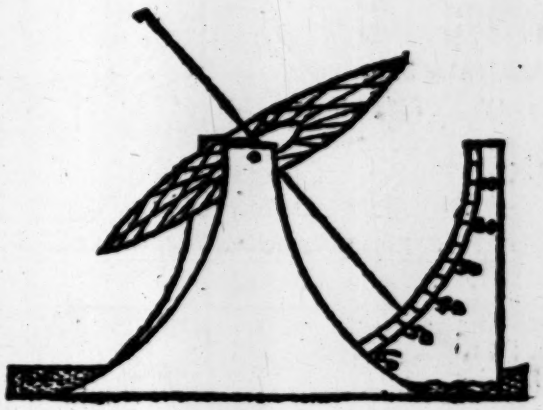
That done take a wyre of iuſt the Diameter of the Inſtrument, and put it through the middle or centre of the Inſtrument, then make it faſte that the one ende be halfe way through on the one ſide, and the other halfe on the other ſide, this done make a frame with three peeces of boordes endes to

hang

hang the diall or inſtrument vpō, with one pinne on the Eaſt poynt and an other on the Weſt poynt: then take an other peece of boardes endes being ſquare, and with a payre of compaſſes ſtrike a quarter of a circle of iuſte the bigneſſe of the quarter of the diall, and cutte all that away, and then the reſt of the ſquare that is left, (at the edge of the quarter of the circle) deuide into. 90. equall partes, marking it thus. 10. 20. 30. 40. 50. 60. 70. 80. 90. as in this forme: laſt of all let this be placed in the middle of the frame, ſo that. 90. may ſtand right vnder the verie middle of the diall and there made faſt, in ſuche forme that the very ende of the wyer when the diall is put vp and downe may touche the hollow parte that you ſee cut away, which is called the Director, and ſo it is finiſhed, and will ſtand altogether in this forme.



The Equinoctiall Diall.



The vse of this Diall is moste necessarie in a shippe, for that you haue occasions to transporte your selues into all the clymates. And to know the true houre of the day doe this: set this Diall by your compasse (the Directer vnto the Southewardes) and then (you knowing how hie the pole is aboue the Horizon) set the ende of the wyer right against that degree in the directer, and the other ende of the wier will poynt iuste vnto the pole, then loke what shadowe the wyer doth giue by the Sunne, that is the true houre of the daye. In lyke manner you may know the true houre of the night by the Moons shadowe, and also the Sonne will giue a true shadowe of hir place. &c.

## ¶ The. 22. Chapter treateth of the soundings, commyng from any place out of the Occident Sea, to seeke Vshant or the Lyzarde, and so all alongst till you come to the coaste of Flaunders: with other necessarie matters to be knowne, to them that be Channeliers, that doth occupie, or deale amongst sandes, bankes, or such other like.

Because it is necessarie to be had in memorie, for that it is a daungerous place to hitte or fall with, to enter into ẏ Sleue, comming homewardes out of Spaine or Portugall, or from Barbarie, or any other place from the Southwards, a shippe that commeth frō any such place to seeke the Ile of Vshant, or the Lizarde in this route of sounding of a. 100. or. 90. fadoms shall finde bigge soundings, and shall be neare aboute to the seames. In the route of. 80. fadoms you shal find cockle shelles, and dentes in the taleh: of the leade: & in this sounding holde on your course to the North till you chaunge sounding, then if you be at. 60. or. 64. fadom, you shall finde small sand and blacke grounde, and shall be neare the coaste of Vshant. If you haue time and day goe seeke it in the Northeast, and you shall be

The sounding neare vnto Vshat and the Lizarde.

be aboute.10.leagues from the Ile. If you coue making your courſe aboute Eaſtfreede, you ſhall finde courſe ſande, red and browne, and you ſhall haue ſounding at.40. fadom: if you be towardes the banke of Silley, you ſhall haue ſoundings at 86.92.90.fadom, & you ſhall finde in the tallow ſtonie ground and ſhall be well ſhotte towards the banke of Silley. When you be at.80.fadome you ſhall finde ſmall blacke ſande, and ſhall be well towardes the Lizarde. When you be at. 60. or 64.fadome, you ſhall finde white ſande & white ſofte wormes, and ſhall be verie nie to the Lizarde. Betweene the cape of Cornewall and Vſhant amidde the channell, you ſhall finde 70.fadome, & neare inough. Betweene Dooman & the Forne in the channell you ſhall haue. 40. or. 50. fadome. If you be thwarte of Plimmouth or the Starte, you ſhal finde ſtreamie ground & dentes in the tallowe, & ſoundings.41.or.42.fadoms. At the cõming from Portland you ſhall haue.35.fadoms, and ſmall ſhingels. And when you be nie to Portland.30.fadoms, & ſtones like beanes: & this ſounding will laſt till S. Aldam, & in the ſayd ſoundings you ſhall find white ſtones like broke Aules, & other that be bigger, & then you ſhalbe thwarte of S. Aldam or of the Ile of Wight. Two or 3.leagues frõ the Ile of Wight, you ſhall finde.25.fadome, with dentes & clefts in the tallow like ſmal threedes.2.or.3.leagues frõ the Caſkettes you ſhall finde.40. fadome & bigge ſtones ragged and blacke. Betweene the Ile of wight & the hagge, the deepeſt is but.35. or.40.fadome. Betweene the Ile of Wight & Lantergate the deepeſt is but.25.or.30.fadome. Betweene Beachy & the Ile of Wight, a league from the land, you ſhall finde.38.fadome, and poppell as bigge as beanes. Betweene Fairely and the water of Summe in the deepeſt but.25.fadom. Betweene Folkeſtone and Bollayne is a banke that is called Rippe rappe: and lieth in the midde way betweene Pickardie and Englande: and harde aborde by it, is.26. or.27. fadome. In the ſtraights of Calice is.30.fadom, in the roade of Calice is.16.fadom. And alongſt the coaſt of Flaunders is but.20. fadome the deepeſt.

The ſounding in the channell.

Thus

The bigth of the pole at the entrãce of the Sleeue.

Thus muche haue I sayde for the entrance of the Sleeue, to come to the riuer of Thames, and in the entrance in the midway betweene Vshant and the Lizarde the pole Artick is eleuated. 50. degrees and a halfe, and the Equinoctiall is lifted aboue the Horyson. 39. degrees and a halfe. And furthermore for them that are channellers and occupiers amongst sandes and banckes, and such other like, they muste haue consideracion of these things followyng. As this: firste (if you knowe howe the channell doth lie right betweene any. 2. sandes) you muste viewe the land to take some markes for it, in this manner to be a leadyng marke. And that you shall do thus: loke something that standeth farre into the lande, that you may knowe it well being right open with the channell of the sandes, then take an other marke neare vnto the water side, and the one to be right agaynst the other, when that you be in the middle of the channell, and then you knowing these twoo markes well, they will be leading markes vnto you for euer to kepe that channell. And then furthermore if it dothe so happen that the channell doth turne to kepe an other course, or els (some other daunger lying in the way) you muste haue a thwarte marke to knowe bothe when that you are cleare of any daunger, and also when that you are open of an other channell, and that you shall do as before is declared, to take some marke within the lande, and also an other neare vnto the sea, water or riuer side, to be your thwarte marke when you bring them both together. And this is moste specially to be noted: that these markes be very yare and good when the one is farre distant from the other: and those markes very slowe and asketh some distance in sayling to open and shette them, whiche are neare together vpon the lande. And furthermore, for them that are Channellers or occupiers amongest sandes, for that the weather is not alwaies cleare, when they haue occasion to passe thorowe suche places, it is good for them to sounde the channelles perfitely, and to knowe by the depthe, what side of the channell they are vpon, and also howe farre

Necessary things to be noted for thẽ that are Chãnellers & dealers amongst sandes.

they

they are shotte into that channell. And also in like maner to know by the sounding of any of the sides of the channell, whether they be neare any of the sandes or daungers, or any breadth of: for ỹ some sandes or dangers there be hauing fayre or good soundings or shaldings, that they may borrowe of and on at their pleasure. There be againe some sandes and dangers that there is no borrowing nor sounding of them, and those be neall or deepe, harde vnto the sandes or daungers: for that the water is deepe harde vnto the sande: and these are verie daungerous sandes for any shippe to come neare, for that they shall haue the water verie deepe, and by and by be a grounde. Yet furthermore it is very good for them that be channellers and occupiers amongst sandes, to know whiche way the tide doth set at euery time of the tide: for that many times it happeneth so, that when the sandes be vnder the water, the tide doth set crosse the channell, which is a daungerous matter if it be not very well considered by the Master or Pilots. &c.

## ¶ The. 23. Chapter, is as touching the variatiō of the Compasse, called the Northeasting and the Norwesting of the Compasse: and how to giue a gesse to know the Longitude.

As touching the variation of the cōpasse called the Northeasting or Norwesting, it is supposed that the Compasse doth varie by proportiō, in the sayling to the Eastwards or Westwardes: and (as I haue declared in the end of the. 6. chapter) it varieth by proportion that the Northpoint is varied one poynt from the North at. 22. degrees and a halfe, and so vntill the North point doth stande Northeast or Norwest. And that is, when you are. 90. degrees from the Meridian that the compas was made at to the Eastwardes or Westwards. Some also are of an other opiniō, that the compas doth varie

Of the cōpasse to varie by euen proportion.

Of the cõpasse to vary by no proportion.

by no proportion, but dothe varie according vnto the nature of some kinde of mineralles, that is, in some countrie or some kynde of Ilandes, that drawe the Compasse by the mines of the Loade stone or Magnes stone that they touche their compasse with when they make them. And furthermore the booke of Martine Curtise, (called the arte of Nauigation) sayeth that the compasse doth varie by proportion, in this mãner: which is, by the proportion of a circle: for that the North poynt dothe alwayes poynt vnto a place in the heauens that is vnmoueable, and therefore as you do transporte your selfe to the Eastwarde or Westwarde, the North poynt doth still poynt vnto that place in the heauen: wherefore (as he sayeth) when you be. 90. degrées in Longitude from the place of the making of your compasse, that is, when you be one quarter of the circumference of the earth, in that paralell the compasse will be varied. 4. poynts from the North: and as you do transporte your selfe further, then the Northe poynt of the compasse will come nearer and nearer vnto the North: and when you are iuste halfe the circumference of the earth, that then the North poynt will stande due Northe vpon the pole agayne: for that you are come to the same Meridian againe vpon the oppolite part of the earth, (as it doth appeare in the third part and. 5. chapter, of the laide booke of Martine Curtise) but if that be true then the compasse doth varie swiftely at the firste and slowly afterwardes in order like vnto the Sunnes declination: by whiche (if it be true) they may very well knowe what order the compasse doth varie by, and so by the variation you may giue an neare estimation of the Longitude, and knowe in howe many degrées the compasse is varied one poynte, two poynts, three poynts, and so the greatest variation whiche is foure poynts. Nowe to knowe the proportion doe this: Firste, make a circle with a payre of compasses, and stryke a Line by the Center to the circumference, which shall be your Meridian lyne, then stryke an other lyne by the Center a crosse, that you may deuide the circle into foure

Of ỹ compasse to varie according vnto the proportion of a circle. that is swiftly & slowly.

equall

equall partes, and then (for that fourtie fiue degrées is the greatest variation) sette fourtie fiue vnto the Eaſte parte and Weſt parte, deuidyng euery one of the quarters of the circle into fourtie fiue equall partes, accordyng to the greatest variation then make an other circle of that Diameter, that the circumference touche the Center of that Circle: and deuide it as you deuide the Compaſſe after the rate of twoo and thirtie poyntes although you nede not deuide but that side to the Northwardes, and then the Northeaſt and Northweſt point will fall vpon fourtie fiue degrées: that done drawe lynes accordyng to the poyntes of the Compaſſe vnto the Eaſtwardes or Weſtwardes, and loke howe they fall vpon the lyne that commeth from the Center of the other Circle of whiche euery quarter is diuided into fourtie fiue equall partes: and then (at the very place that the lyne dothe touche) drawe paralell lynes in that Circle by proportion, at the very place to the Caſtewardes or Weſtwardes that the lyne of the Compaſſe falleth vpon: and that will ſhewe you iuſtly howe many degrées you ſhall tranſporte your ſelfe vnto the Eaſtwardes or Weſtwardes, for the varying of the firſte poynte, ſeconde poynte, and thirde poynte, and in lyke manner the greateſt variation whiche is the fourthe poynte. So that (accordyng to that order) it will fall out in this manner, that the Compaſſe will be varied one point at neare eleuen and $\frac{1}{7}$. It will be varied twoo poyntes neare aboute foure and twentie degrées and a halfe. It will be varied thrée poyntes at fourtie twoo degrées, and aboute a halfe. But it will not be varied the fourth point vntill you be full foure ſcore and tenne degrées from the Meridian that the compaſſe was made at: whiche is a very ſlow varying beyng. 47. degrées and $\frac{1}{2}$ before the Compaſſe dothe varie one poynt, and betweene the thirde poynt and the ſeconde poynt beyng. 18. degrées for the varying of that poynt, and then from the ſeconde poynte vnto the fyrſte poynte, it

To know in how many degrees goyng vnto the Eaſtwarde or Weſtwarde that the compaſſe doth varie one poynt or. 2. points or. 3. points. &c.

To knowe how many degrees is in the varying of one poynt.

is. 13. degrees and better, and last of all from the varying of one poynt to the Meridian it is. 11. degrees and $\frac{1}{7}$ parte, euery degree beyng according to the parralel you are in, which dothe alter according vnto your Latitude from the Equinoctiall: for vnder the Equinoctiall it is. 60. Englishe miles, or. 20. English leagues vnto one degree. In the Latitude of. 60. degrees from the Equinoctiall there in that parralell it is but. 30. myles, or. 10. Englishe leagues vnto one degree. &c. as it is plainely shewed in the. 16. chapter of this booke, wherein is an instrument shewing you howe many miles of Longitude will answere vnto a degree in euery seuerall Latitude by the replying of a threed at your discretion: so that I conclude if the compas doth varie by that order of proportion that Martine Curtise dothe attributs vnto it, you may gine a neare ghesse to finde the Longitude by the varying of the compas beyng neare vnto the Meridian that the compas was made for. But if you be very farre from the Meridian that the compas was made for, then the variation is so slowe that you can haue no iudgement at all (by the variation of the compas) to finde any Longitude. And furthermore if the compas dothe varie by that proportion that Martine Curtise doth affirme, I am of that opinion that there may growe some errour in proportion in those compasses that are made for any Meridian: for those compasses that are made here with vs in Englande whereof the needle dothe standa. 4. or. 5. degrees vnto the Eastwards of ỳ North (as doth appeare by all the needles made for dials & also in the compasses) if they would haue the North point to standa due North, then the ende of the wyers vnder the carde of the compasse should standa foure or fiue degrees vnto the Eastwards of the Flourdeluce: wherefore it may be doubted that the compasse maye varie more the one way than it will the other way, by that proportion that the ende of the wyre dothe standa beside from the North poynt. For (if in the greatest variation) the ende of the wyre (vnder the carde of the compasse) doth standa Northwest, the flourdeluce

If you will know howe many leagues a degree is, repayre to the 16. chapter.

There may growe some errour in ỳ proportion of the varying of the Compasse.

delace of the compaſſe ſhould ſtande neare halfe a poynt to the Weſtwards of the Northweſt. And in like maner at the greateſt variation, if the ende of the wyre doth ſtande Northeaſt, then the Flourdelace ſhould ſtande neare halfe a poynt vnto the Northwards of the Northeaſt. &c. And further more here is one thing that I could neuer vnderſtande the truthe of, and yet I haue oftentimes demaunded the queſtion of pyners that haue beene in the Weſt part, in the bay of *America*, and that is this: Whether in the compaſſe there made, or in the dials that are there made, the endes of the Needles doe ſtande due Northe, or not? and yet it hath not beene my chaūce to meete with any that can tell. For if it be ſo that thoſe Needles that are there touched doe ſtande due Northe, then it were very good for them that ſhould occupie long traueſe vnto the Weſtwarde or Eaſtwarde, to haue diuers compaſſes ready made with the Needle of them vntouched, and to carie a good Lodeſtone with them to touche thoſe compaſſes when the compaſſe hath the greateſt variation. It is good for theſe two cauſes: the one cauſe: it is the better to direct your courſe by. But this cauſe is very ſperiall, to giue a neare geſſe of the Longitude, that is to ſay, the compaſſe will varie more quickly (according to the order before written) by which you ſee they may tranſporte them ſelues further vnto the Eaſtwards or Weſtwardes before that the compaſſe dothe varie one poynt, than it dothe for the other three poynts, ſo that they are not able to giue any eſtimation at all, by the varying of the compaſſe, to knowe any Longitude: for that they may trauel more than the quarter of the circumference of the earth, before the compaſſe will be varied one poynt backewardes and forwardes. And I do very muche marueil at this, (conſidering how many times Engliſh men haue bene in the weſt Indies) that I can meete with no man that can tell whether the needels of the Dials or compaſſes made there do ſtande due Northe or not: whiche is a thing that may be eaſily knowne. For the needels of the Dials it is ſeene ſeene, and in

Things that I can not know.

Of ſlowe varying of the cõpaſſe.

How easy it is to knowe whether ẏ the cõpasses made in the West Indies, do stãd due North.

Of making notes of the variation.

like maner of the Compasses: for if the Needle of the Compasses there made will not stande due North, then it is reformed vpon the Carde of the flye of the Compasse, as if the North ende of the wyers doe stande Northeast, then they wil set Northeast ouer it, euen as we doe set the ende of the wyers of the Compasses with vs made neare halfe a poynt to the Eastwardes of the Northe. &c. And furthermore it is very good for them that are Masters or Pylotes of shippes to note, when they doe fall with any lande where the Compasse is varied, to make a remembrance in a booke howe many poyntes and degrees the Cõpasse is varied in euery place where they come vnto, which will be a great helpe for them to finde that place agayne. And to finde the variation it is declared in the 6. Chapter. And heere I leaue to trouble thee any further for this time: but shortly after this, looke for two other workes of myne, the one called, The shoting in great Ordinance: an other named, A Treasure for Trauellers: which two Bookes will be profitable I trust for all men. If these my labours may profite my Countrey, then haue I my desire. And thus I bid thee moste hartily farewell.

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THe firſt chapter of Nauigatiō ſheweth what the.32. poyntes of the compaſſe be, and to what vſes they do ſerue. Fol.8.a

The.2. chapter treateth of the golden number or prime, ſhewing the Epact, and by the Epact to knowe the age of the Moone. Fol.9.b

The. 3. chapter teacheth howe to know by the age of the Moone what a clocke it dothe flowe, or is full Sea at any place where you do knowe what Moone maketh a full Sea. Fol.10.b

The.4.chap.treateth of the Sunne and Moones courſe in the Zodiacke, and howe you ſhall knowe at what houres the Moone ſhal riſe and ſet at: and at what poynt of the Compaſſe, with other neceſſarie things. Fo.14.a

The.5.chapter is of a table of declination, commonly called of Seafaring men a Regiment of the ſunne, exactly calculated for.4. yeres, and will ſerue for. 24. yeres, for euery daye of the monthe. Fol.16.b

The. 6. chapter ſheweth howe to take the height of the Sunne with the Croſſe ſtaffe.&c. Fol.26.a

The. 7. chapter ſheweth howe to handle the declination of the Sunne, to know the altitude of the north pole aboue the Horizon (the height of the Sunne beeing truly taken & knowne in any place betweene the North pole and the Equinoctial) ſo that the ſunne be vnto the Southwards of you at the taking of the ſame vpon the Meridian. Fol.29.a

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The.9.chap. ſheweth howe to handle the declination of the ſunne when you are beyonde the Equinoctial, that is to ſay, betweene the South pole, and the Equinoctiall: with certen enſamples bothe for the South pole, and the North pole. Fol.32.a

The.10.chapter ſheweth howe to handle the ſunnes declinatiō vnto the Northward, where the ſunne doth not ſet vnder the Horizō: and alſo to take the ſun at the loweſt due north. f.34.b

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The

The.14.chapter sheweth howe to knowe howe farre any lande is off from you, if you knowe the distance betwene any two places, whether that you do runne alongst by the lande, or directly to the shore, or otherwise: with other necessarie things. Fol.40.a

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The.19.chapter is as touching the making of plattes or Cardes for the Sea, and not to paynt their Cardes as they doe, but rather to fill the vacant places with other necessarie matters: and also of three necessary things conteyned in the Plattes or Cardes, with their vses. Fol.49.a

The.20.chapter is of the longitude and declination of. 32. notable fixed starres for Nauigation, with tables of their shining, and at what poynt of the compasse they do both rise and set: it hathe also tables for euery monthe in the yere, declaring at what time they wil be South.&c. which wil continue these.100. yeres without muche error. Fol.51.b

The. 21. chapter sheweth you the making of a generall Instrument, to know the houre of the day by through out all the worlde. Fol.57.b

The.22.chap.treateth of the foundings cõming from any place out of the Occidentall Sea, to seeke Vshant, or the Lizarde, and so all alongst tyll you come to the coast of Flaunders: with other necessarie matters to be knowne for them that be Chanellers, that occupie or deale amongst sandes, bankes.&c. Fol.59.b

The.23 chapter is as touching the variation of the Compasse, called the Northeasting and Northweasting of the Compasse: and howe to giue a gesse to know the longitude. Fol.61.a

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